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Road Material Source Plan...

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GRAND TETON NATIONAL PARK
JOHN D. ROCKEFELLER, JR., MEMORIAL PARKWAY • WYOMING

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road material source plan
environmental assessment

draft
april 1992

GRAND TETON NATIONAL PARK
JOHN D. ROCKEFELLER, JR., MEMORIAL PARKWAY • WYOMING

UNITED STATES DEPARTMENT OF THE INTERIOR / NATIONAL PARK SERVICE
DENVER SERVICE CENTER

SUMMARY

This plan identifies sources for and impacts of supplying approximately 3 million cubic yards of unprocessed aggregate material for the immediate and 10-20 year NPS road rehabilitation program for Grand Teton National Park, the John D. Rockefeller, Jr., Memorial Parkway, and the southern portion of Yellowstone National Park. Road reconstruction would consist of asphalt paving overlays, shoulder reinforcement, and continued maintenance by chip-seal application, pothole patching, and sanding. Two action alternatives (A and B) and a no-action alternative (C) are presented.

The preferred alternative (A) would use a combination of in-park and off-park material sources to reduce environmental impacts and reduce the cost of hauling material while concentrating activities at selected areas. Sources on parklands would supply projects on the roads of northern Grand Teton, Rockefeller Parkway, and southern Yellowstone, with a combination of NPS, Bureau of Land Management, National Elk Refuge, and commercial sources to supply projects on southern Grand Teton roads. Approximately 60 acres of native vegetation would be impacted. This acreage along with existing abandoned borrow pits would be reclaimed. All actions would avoid affecting endangered species. Wetlands at the Snake River site could be impacted if that site is selected. No other significant impacts would be expected on park resources or visitor use.

Alternative B would provide the same quantity of material but use off-park sites. This alternative would have significant impacts on the cost of the road projects and the economy of the local communities. There would be no impact to park resources except along Spread Creek where the national forest access road (on parklands) would be widened to accommodate haul trucks. Impacts to visitors would be greater under this alternative due to increased hauling distances, which would mean haul trucks would be on the roads that visitors use for longer periods of time than in alternative A.

Alternative C, the no-action alternative, would continue material extraction for park road rehabilitation projects without a comprehensive plan.

Address comments on this plan to:

Superintendent
P.O. Box 170
Grand Teton National Park
Moose, WY 83012

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INTRODUCTION

PURPOSE OF THIS PLAN

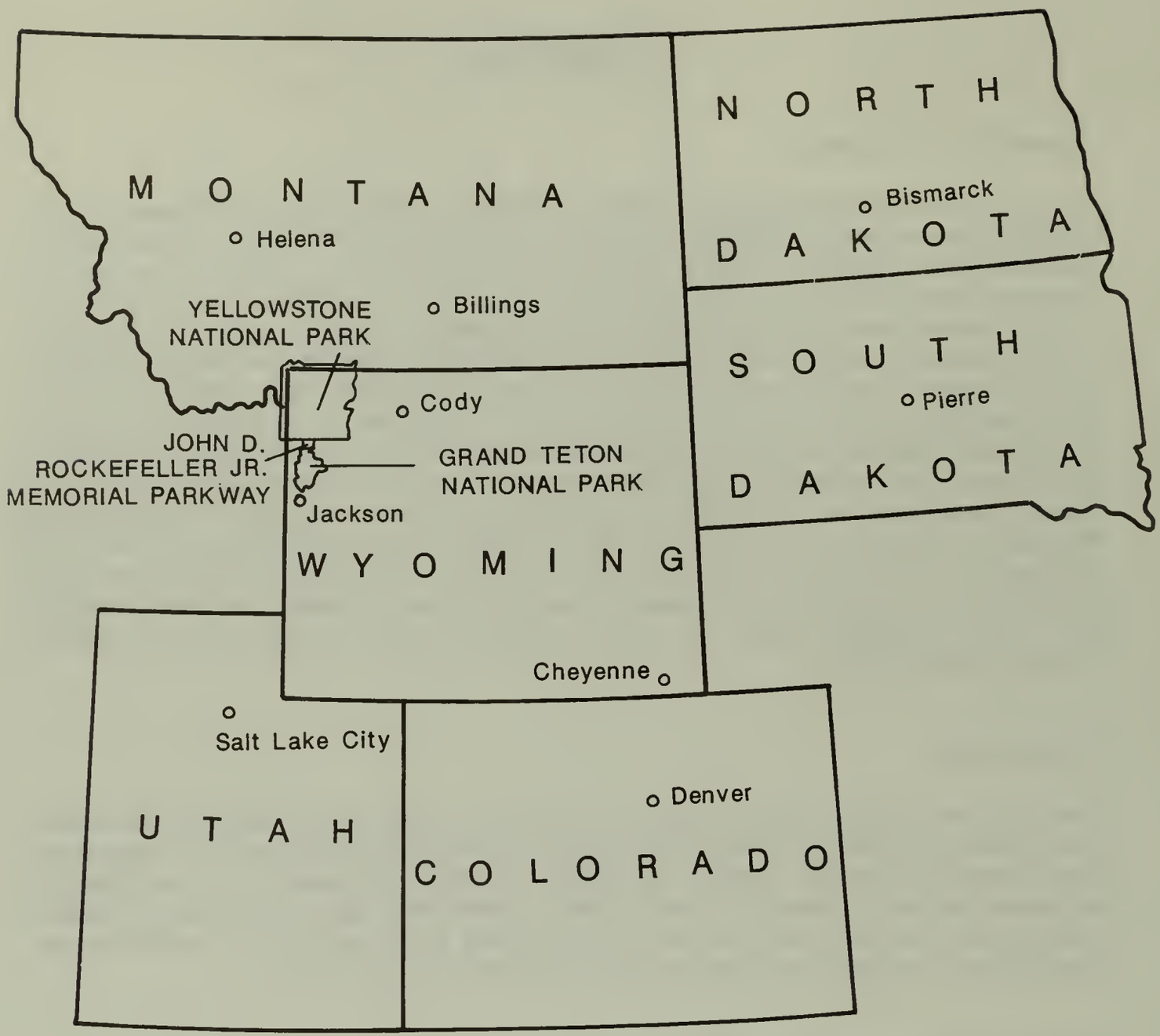
Sources of crushed-stone aggregate, sand, and topsoil to supply National Park Service (NPS) road maintenance and rehabilitation and other maintenance needs in Grand Teton National Park (hereafter referred to as Grand Teton); John D. Rockefeller, Jr., Memorial Parkway (the Parkway); and the southern portion of Yellowstone National Park (Yellowstone) south of West Thumb. Several recent NPS road rehabilitation projects have used material sources within Grand Teton National Park, with environmental assessments issued for each project. However, a comprehensive material source plan and environmental assessment is needed to identify an immediate and a long-term strategy based on NPS policy to aid in selecting sources, ensure a predictable long-term supply of material, and analyze potential impacts on the environment. The consequences of implementing this plan are analyzed in this environmental assessment. This plan also assesses the cumulative effects of implementing this plan as required by the National Environmental Policy Act. The necessary environmental compliance documents will be prepared at later dates to analyze the impacts, on a site-by-site basis, of extracting materials and rehabilitating specific roads; however this plan will identify potential borrow sites and road development areas and analyze potential impacts to ensure that no adverse cumulative effects occur.

STUDY AREA

The study area analyzed in this document includes public and private lands in Teton County west of Togwotee Pass and Slide Lake, north of Hoback Junction, and east of the base of the Teton Range (see Region, Location, and Study Area maps). Because of the area's geologic conditions, abundant quantities of good quality material are available in this area. Costs of going beyond the study area were excessive because of increasingly long haul distances, steep grades, and, in some cases, hauling through the town of Jackson.

NEED FOR MATERIAL SOURCES

The road systems of Grand Teton and the Parkway have approximately 170 miles of paved roads and 76 miles of unpaved roads. An additional 22 miles of paved road in Yellowstone south of West Thumb junction are included in this plan due to the geographic relation of this area to the study area and the lack of suitable material sources in southern Yellowstone due to its geologic history. The average service life of intermediate-type asphalt pavement roads, such as park roads, is 10 to 20 years. After this time the surface deteriorates and should be repaved with an asphalt concrete overlay, with drainage corrections, shoulder reinforcement, and safety improvements also made where necessary. Asphalt concrete pavement should also be maintained by chip-seal coat applications on a six- to seven-year cycle. Building and utility maintenance also require aggregate and sand for pipe bedding material, septic drain fields, and concrete production. Reclamation of areas disturbed during construction and abandoned borrow sites requires topsoil for plant growth. All of these actions require what will be referred to as construction material or simply material(s) in this document — crushed stone aggregate, sand, and topsoil (see Glossary).



Region

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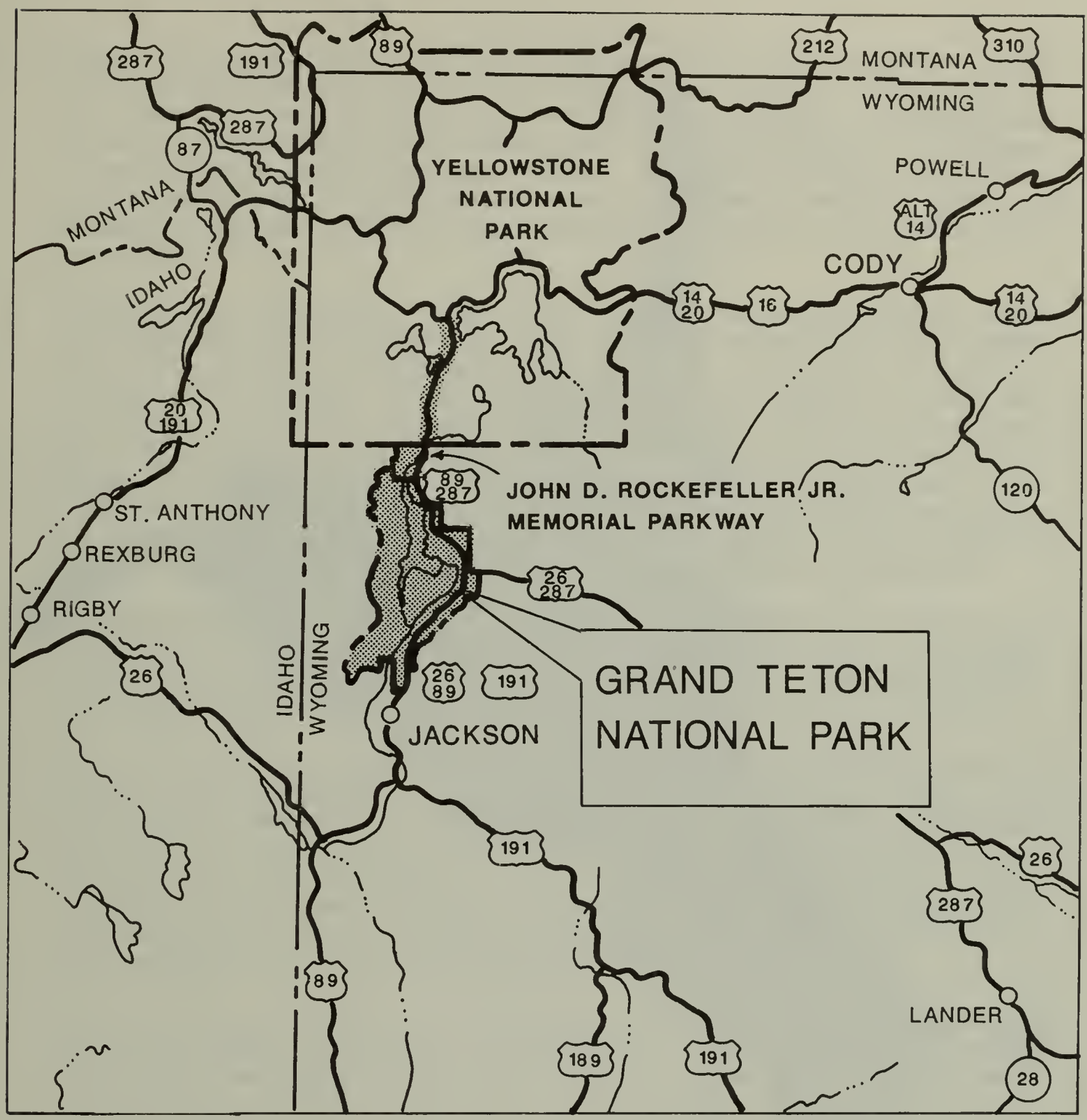

Location

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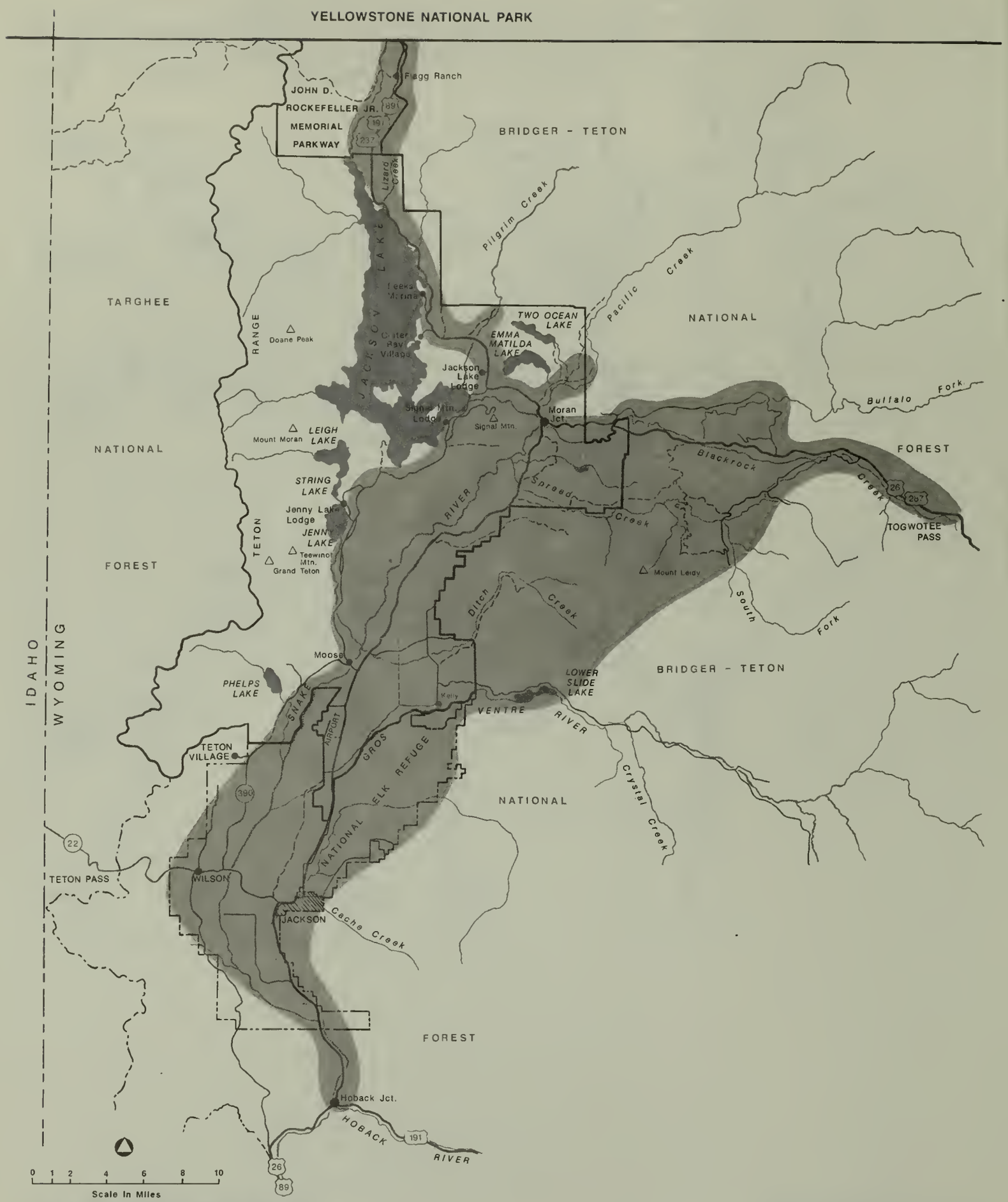

Study Area

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This plan assumes that all paved NPS roads would be repaved within the next 20 years, and that sources of considerable quantities of construction material would be required reasonably close to the application sites. Material needs described here are for maintaining road surfaces and possible minor widening of road shoulders in Grand Teton. The Yellowstone road between the south entrance and Grant Village is narrow and would also require quantities of embankment fill to provide a top width consistent with other recently reconstructed roads in the two parks. At this time no construction of new roads or major realignments of existing roads are planned.

A technical report prepared by the Federal Highway Administration (FHWA) identified existing sites in the study area and estimated potential reserves and engineering quality of material (FHWA 1991). Of the sites identified in the FHWA study, at least 40 sites (borrow pits) occur on upland portions of Grand Teton and the Parkway. Most of the pits on parklands were developed 20 to 50 years ago, and reclamation was ignored or was a very low priority. All but three of these sites are inactive or have been abandoned, with different degrees of plant growth and varying needs for reclamation. Reclamation costs can be funded with a road project if the site provides material for the project. Other sources of reclamation funding have been very limited in the past. There is potential for using existing sites for limited-term material sources or staging areas, with site reclamation accomplished at the end of the project.

Construction projects in the past have extracted material from riverbeds inside and outside of Grand Teton. Periodic removal of stream-deposited sand/gravel/cobble material is necessary to clear stream channels under highway bridges because of continuing sediment deposition. This activity is analyzed in conjunction with upland sources in and around the parklands.

The quality of material is important. Aggregate material for processing into pavement and concrete must be relatively clean, hard, durable stone. The particle size of material to be processed must be such that a specific grading of material can occur through processing such as crushing or screening. The material cannot be susceptible to chemical change through exposure to air or water. It must also be resistant to degradation or breakdown from weather and loading stresses. Material sources must contain a sufficient quantity of raw materials of consistent quality to facilitate economical extraction and processing. Reject material, such as fine particles, are returned to the source as part of the reclamation process.

Material needs for Grand Teton and the Parkway over the next 20 years have been estimated by the Federal Highway Administration at approximately 1.8 million cubic yards of raw material for processing into aggregate and sand, and 200,000 cubic yards of common borrow embankment fill. An additional 1 million cubic yards of raw material is needed for rehabilitation of southern Yellowstone roads. Due to the poor road construction qualities of the volcanic material in Yellowstone, aggregate would continue to be supplied from the south for this NPS area. However, these demands would exceed the known reserves of the only current commercial material source in Teton County, which is approximately 500,000 cubic yards with potential for additional accretion of river-transported material. New construction methods such as asphalt recycling might reduce projected aggregate needs.

The following table identifies the estimated 20-year requirements for NPS roadway maintenance and rehabilitation. The parks have been divided into seven areas as shown on the Roadway Surfacing Areas map.

TABLE 1: ESTIMATED 20-YEAR NEEDS FOR AGGREGATE MATERIAL GRAND TETON/ROCKEFELLER PARKWAY/SOUTHERN YELLOWSTONE[a]

(Cubic Yards, Unprocessed)

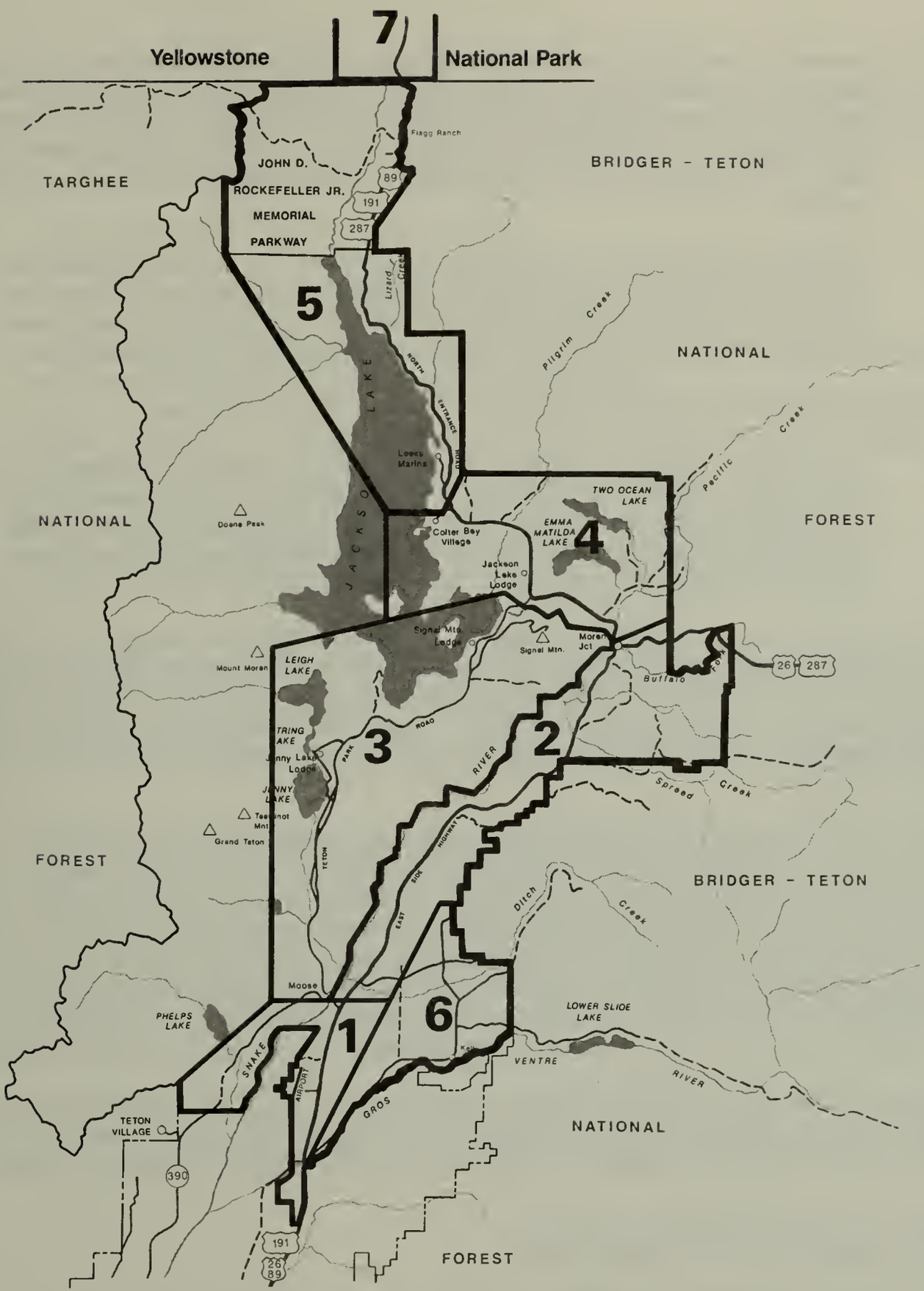
	SHORT RANGE 0 - 5 YEARS			INTERMEDIATE RANGE 5 - 10 YEARS			LONG RANGE 11 - 20 YEARS			
AREA	**CONST.**	**MAINT.**	**SAND**	**CONST.**	**MAINT.**	**SAND**	**CONST.**	**MAINT.**	**SAND**	**TOTALS**
1	-0-	25,000	1,000	85,000	25,000	1,000	7,000	50,000	2,000	196,000
2	84,000	30,000	2,000	69,000	30,000	2,000	74,000	60,000	4,000	355,000
3	3,000	44,000	1,000	84,000	44,000	1,000	107,000	88,000	2,000	374,000
4	12,000	29,000	2,000	149,000	29,000	2,000	127,000	58,000	4,000	412,000[c]
5	4,000	31,000	2,000	27,000	31,000	2,000	88,000	62,000	4,000	251,000
6	28,000	26,000	1,000	123,000	26,000	1,000	157,000	52,000	2,000	416,000[c]
7[b]	95,000	94,000	-0-	12,000	75,000	-0-	506,000	189,000	-0-	971,000
TOTAL	226,000	279,000	9,000	549,000	260,000	9,000	1,066,000	559,000	18,000	**2,975,000**

[a] Adapted from table 1 of FHWA source study (FHWA 1991)
[b] Southern Yellowstone National Park
[c] Increased by 100,000 cubic yards over FHWA estimate to include potential common borrow needs

NPS POLICIES AND OTHER PLANNING CONSIDERATIONS

Specific direction on the use of material from sources within parks is provided in the NPS *Management Policies*, chapter 9:4 (NPS 1988).

> Materials from borrow pits or other sand or gravel sources on NPS lands, including submerged lands, may be used only by the National Park Service in connection with functions necessary for park administration. Superintendents will only create or use new borrow pits or other sources or continue to use existing sources inside the park if it is determined, based on a written analysis, that economic factors make it totally impractical to import sand or gravel and if acceptable sources are identified in the park resource management plan.
>
> When the National Park Service must obtain borrow materials or create spoil areas within a park, it will use areas devoid of significant cultural and natural resources, as identified through appropriate studies, and areas not viewed or used by visitors. Such areas will be restored to be compatible with the surrounding environment. All proposals for obtaining materials from a previously



Roadway Surfacing Areas

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unused source within a park will be reviewed under all pertinent environmental statutes, including the National Environmental PolicyAct (42 USC 4321 et seq.), the National Historic Preservation Act (16 USC 470 et seq.), the Endangered Species Act (16 USC 1531 et seq.), and the Clean Water Act (33 USC 470 et seq.). All applicable federal, state, and local permits will be obtained prior to the creation and use of new borrow sources.

Proposed borrow pits and spoil areas outside parks will also be evaluated to ensure that use by the National Park Service or its contractors complies with all applicable statutes and regulations and does not negatively impact resources or values inside the park. Such areas will be restored as appropriate.

NPS Special Directive 91-6 (see Appendix) provides additional guidance).

The definition of "totally impractical" is, by necessity, case-specific. There is no set formula for determining what percentage increase in a project cost makes an outside source totally impractical. The park manager must weigh the expected costs and effects of an in-park source against expected costs and effects of outside sources to determine the acceptability of in-park sources.

A Framework for Coordination of National Parks and National Forests in the Greater Yellowstone Area was issued by the interagency Greater Yellowstone Coordinating Committee (GYCC 1991). This plan calls for inventorying sand, rock, and gravel material extraction operations in the Greater Yellowstone Area, limiting material extraction in parks, reclaiming abandoned pits on both national forests and parks, and obtaining material from sources outside parks.

Most of Teton County is public land under management by the National Park Service, the U.S. Department of Agriculture, the Forest Service (USFS), the U.S. Fish and Wildlife Service (USFWS), and the Bureau of Land Management (BLM). Large quantities of good quality material exist on privately owned undeveloped land in the county; however, these lands also have high scenic, environmental, and monetary values. Most of the private land in the county is zoned agricultural or residential under the *Teton County Comprehensive Plan* (Teton County Commission 1978). This plan is currently being revised. Development of aggregate sources on private land would require conditional use permits issued by the county commissioners.

Because some material sites considered in this plan are on or near other federal or state lands, close coordination with these agencies would be necessary to ensure maximum resource protection and the least disruption to these other agencies' ongoing programs.

SITE SELECTION CONSIDERATIONS

Sites listed in the following "Alternatives Considered" section were initially screened in the 1991 FHWA study and met the basic requirements for quality and quantity of materials. The sites containing suitable materials were then considered in terms of NPS policy and obvious environmental, social, and legal constraints (see Appendix).

The sites meeting the above screening procedures and listed in the alternatives in this document will be further analyzed according to Special Directive 91-6 (see Appendix) and detalled In future project-specific environmental compliance documents. The sites will also be subject to full compliance with all applicable laws and regulations. The major factors that will be considered prior to use of any site will include

technical aspects — material quality/quantity

economics — site development costs, haul distance, etc.

social/political — conflicts with landowners/managers and effects on park visitors, park operations, concessions and commercial operations, etc.

natural resources — wetlands, water courses, endangered species, sensitive management areas, etc.

cultural resources — archeological sites and historic sites and landscapes

ALTERNATIVES CONSIDERED

ALTERNATIVE A: SOURCES FOR A COMBINATION OF MINIMUM IMPACT AND REDUCED ECONOMIC COST — PREFERRED ALTERNATIVE

INTRODUCTION

This alternative describes a number of source options to supply material needs for long-term (20-year) road maintenance and reconstruction projects for Grand Teton, the Parkway, and southern Yellowstone. The proposed sources were selected based on NPS policy, minimal resource and social impacts, and reduced economic cost. The areas of southern Yellowstone and northern Grand Teton would generally be supplied from sources on NPS land in northern Jackson Hole. Southern Grand Teton would be supplied by purchase from commercial sources when available, or from sources developed on federally administered lands. The extraction quantities and proposed extraction/processing actions are described in this section. Locations and resource conditions are described in the later "Affected Environment" section, and impacts are described in the "Environmental Consequences" section.

As stated earlier, Grand Teton, the Parkway, and southern Yellowstone have been divided into seven roadway surfacing areas to analyze the impacts of obtaining material for road projects (see table 1 and Roadway Surfacing Areas map). Beginning within the next year and during the next 20-year period, approximately 2 million cubic yards of raw material would be extracted and processed into aggregate or other maintenance material or would be used as common borrow material in Grand Teton and the Parkway. Approximately 970,000 cubic yards would be extracted for southern Yellowstone roads.

Management flexibility is needed for final selection of borrow sources for a specific project because of the long-term nature of this plan, and because use of one borrow source influences decisions to use other sources. However, the sites and quantities described herein would be the upper limits, and actual quantities at a given site might be reduced. The number of sites actually used will depend on the project-specific site selection process. Material extracted from park sources would only be used for park purposes, either by NPS maintenance crews or contractors, in compliance with NPS management policies (see "NPS Policies and Other Planning Considerations" section).

Typical activities for opening a new upland material site would be stripping the vegetation, stripping and stockpiling topsoil, excavating and processing the aggregate, and returning reject material to the excavated upland sites. Processed material would then be trucked to the road project and placed or stored for future use. The location of the crushing and screening equipment and the asphalt plant would depend on the material site selected for the specific project. Processing sites and haul roads would be subject to the same selection criteria as the material sites.

Activities in stream channels would differ significantly from upland activities. Vegetation clearing and topsoil stripping would not be necessary. Excavation would be confined to the channel above the base flow elevation and would not be conducted in flowing water. The depth of the excavations would be shallow to prevent channel destabilization. All extracted material would be immediately hauled to an existing upland processing/material site, and no material would be stockpiled in the channel. An existing processing/material site would be required for disposal of reject material.

Usable finished road paving and base course aggregate material typically represents 50-80% of the total raw material that is processed. If a portion of the remainder is usable for other purposes, such as sanding or utility line bedding material, it would be stockpiled for future use. Rejected material would be transported to existing upland excavations for disposal.

Unless sites are dedicated to long-term use, upland material sources and staging areas on parklands would be reclaimed after use; reclamation costs would be funded as a part of road construction costs. Reclamation would consist of contouring the site to resemble natural landforms and removing unnecessary access roads. Additionally, the surface of the disturbed area would be decompacted after removing stockpiled material, and salvaged topsoil would be placed. The area would then be replanted with appropriate native plant materials. Commercial sources are required to have reclamation plans, and a portion of the royalty fee paid by the purchaser would be set aside for eventual site reclamation.

SOURCES

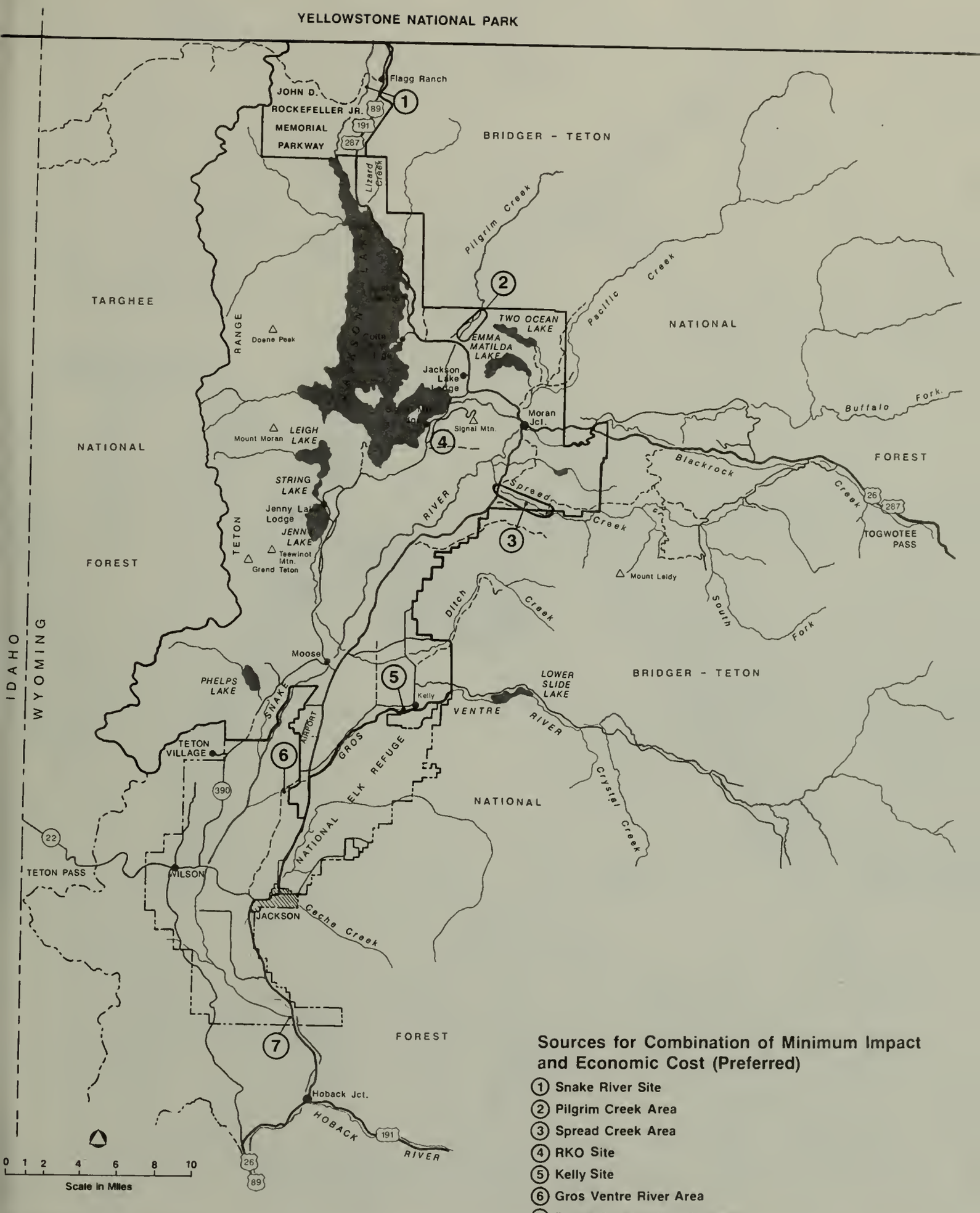
The following sources (see Alternative A map) would provide an array of options to supply park road rehabilitation projects over the next 20 years.

1. Snake River Site

Material might be extracted from this existing borrow site in the Parkway 0.6 mile west of the North Entrance Road and 0.8 mile south of the Snake River bridge at Flagg Ranch in the Parkway (see Snake River site map). Estimated reserves are 266,000 cubic yards of raw material, which could be extracted for southern Yellowstone projects. The total estimated amount of material needed for southern Yellowstone is 971,000 cubic yards. When material is exhausted at this site, supplemental material could be hauled from the south. Material could be extracted over two to five years, with stockpiling, processing, equipment storage, and staging occurring at the site. An additional 10 acres of undisturbed soil and vegetation might be cleared for material excavation. Reclamation (see Glossary) of this site would be a major emphasis, including all of the existing disturbed area and access road. Approximately 46 acres of ponds would be created. The remaining 29 acres, including the access road, would be reclaimed to grass/willow floodplain or lodgepole forest.

2.0 General Pilgrim Creek Area

This area, between Colter Bay and Jackson Lake Lodge, includes existing upland borrow sites that were used and abandoned several decades ago and alluvial deposits in the normal high-water channel of Pilgrim Creek (see Pilgrim Creek Area map). Material from this area would supplement the Snake River site for southern Yellowstone and could supply up to 1.4 million cubic yards for projects in northern Grand Teton. The reserves in the area exceed this quantity.



Sources for Combination of Minimum Impact and Economic Cost (Preferred)

1. Snake River Site
2. Pilgrim Creek Area
3. Spread Creek Area
4. RKO Site
5. Kelly Site
6. Gros Ventre River Area
7. Evans Construction Company
8. Potential commercial development – no specified sites shown

Alternative A

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Snake River Site

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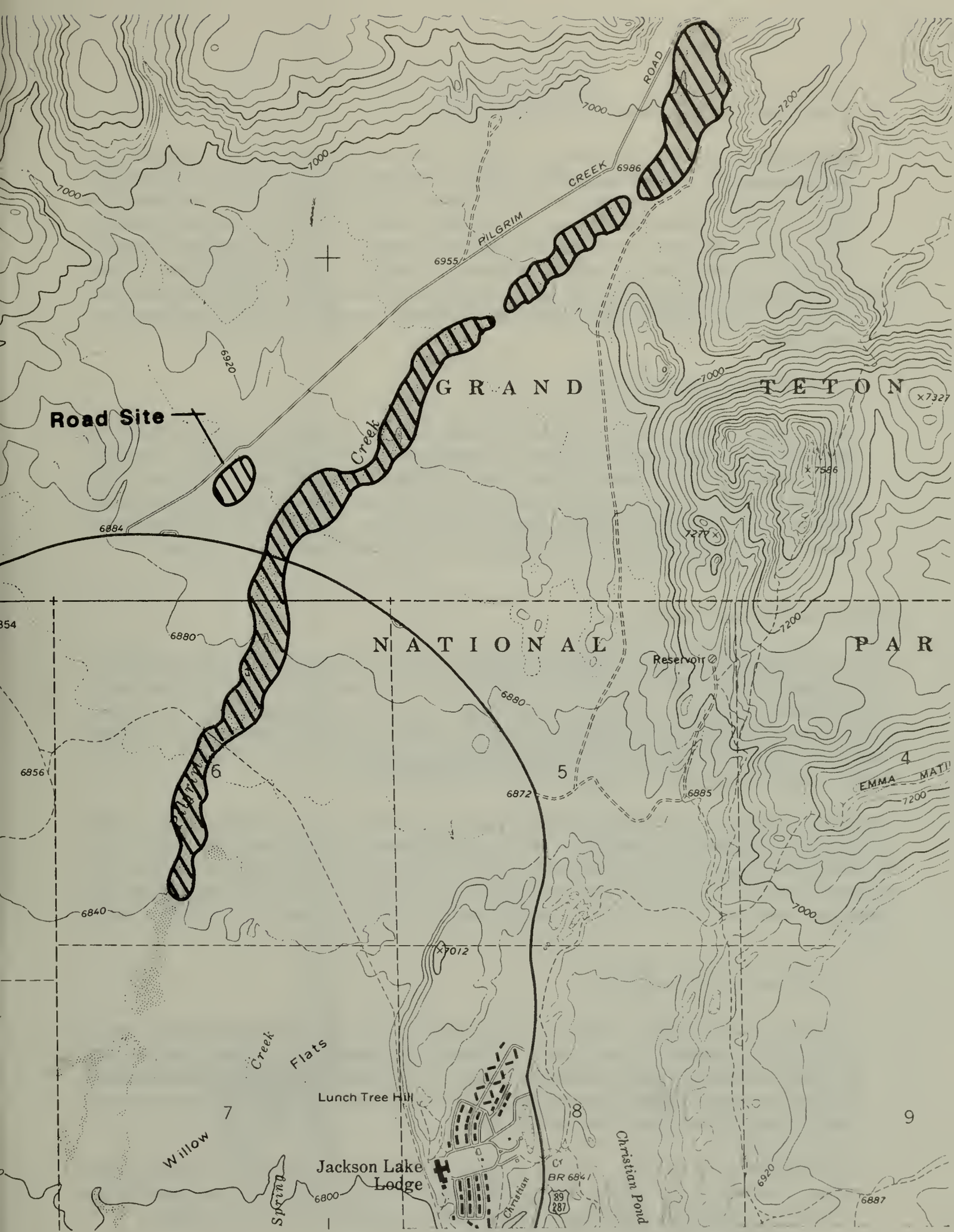

Pilgrim Creek Area

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2.1 Pilgrim Creek Channel Area

Material would be removed from the Pilgrim Creek high-water channel upstream and downstream of the North Entrance Road bridge. Suitable materials exist approximately 2.2 miles upstream from the bridge (near the national forest boundary) and downstream for about 1.5 miles. Estimated reserves are 200,000 cubic yards of material within 10 acres of the bridge, with much more available along the channel. Greater quantities of material, in millions of cubic yards, could be extracted by using a longer reach of the channel. Material would be hauled to an existing nearby upland site (site 2.2 below) for processing or to the existing Colter Bay maintenance material storage site for processing and stockpiling.

2.2 Pilgrim Creek Road Site

This existing 10-acre borrow site is 0.1 mile east of the North Entrance Road and immediately south of the Pilgrim Creek national forest access road. The site would be used exclusively as a processing site to support excavation from site 2.1 above. Reject material would be placed into the pit until the pit is completely full, at which time the site would be revegetated with native plant materials. If/when the pit is closed, an alternate processing site would be developed based on the site selection considerations.

3.0 General Spread Creek Area

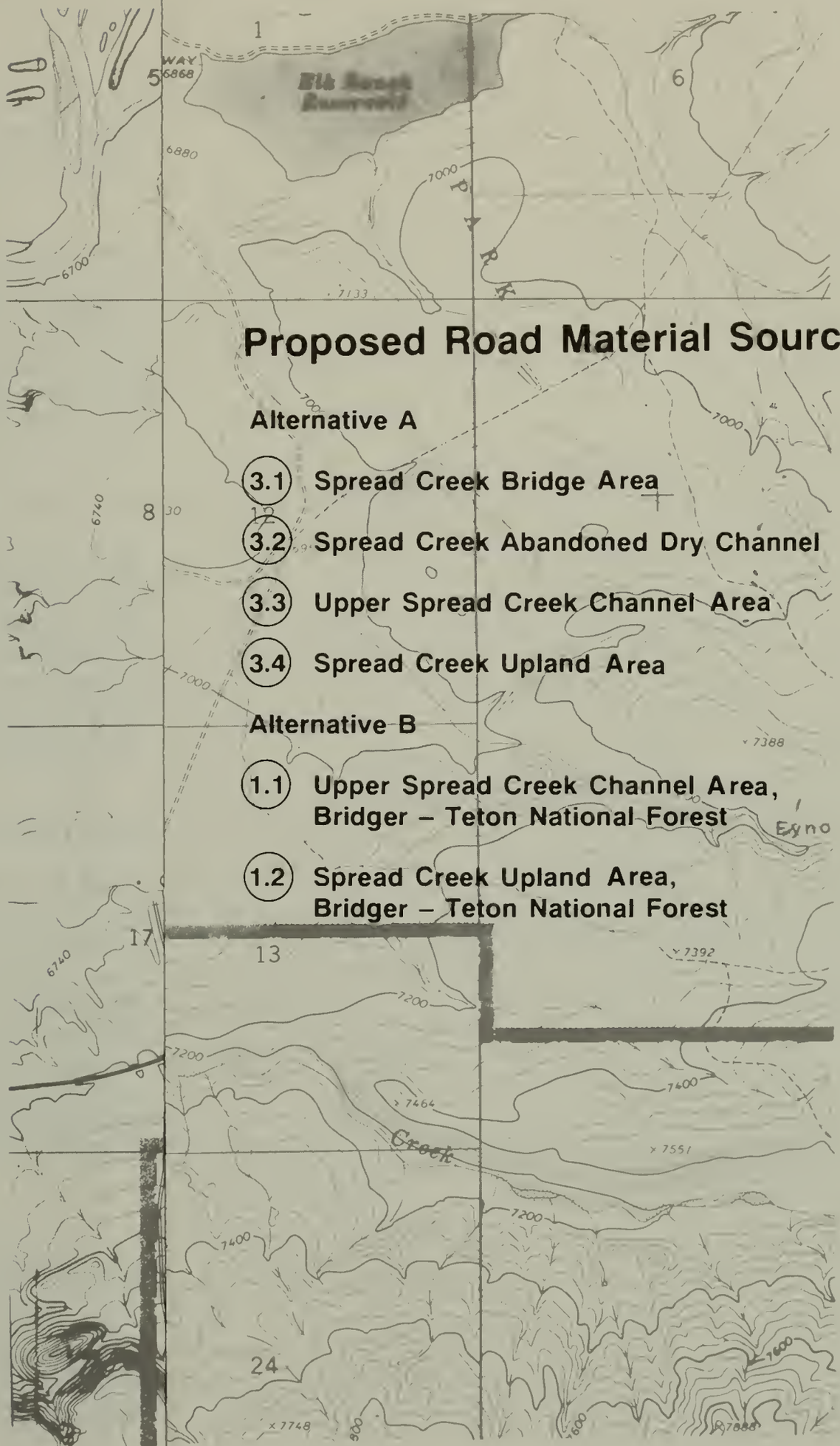
This large area south of Moran Junction includes both high-water channel and upland deposits along Spread Creek within Grand Teton and Bridger-Teton National Forest (Bridger-Teton). A combination of the sites described below might be used (see Spread Creek Detail map). Sufficient quantities of material could be extracted to supply projects in Grand Teton roadway areas 2, 4, and 5 (see Roadway Surfacing Areas map). The Evans Construction Company site, south of Jackson, could supplement the Spread Creek sites.

Short-term needs between 1992 and 1996 would be 200,000 - 300,000 cubic yards of material to supply the scheduled completion of the East Side Highway (U.S. Highway 26/89/191) north of Snake River overlook. The preferred strategy would be extraction from site 3.4 (below) to create a pit for disposal of rejected waste material and development of a processing area. Extraction would then shift to site 3.3 (below), with material processed and stockpiled at site 3.4.

3.1 Spread Creek Bridge Area

This area is within Grand Teton — 0.7 mile downstream of the East Side Highway bridge to 0.3 mile upstream of the bridge, following the existing high-water channel. The estimated reserves in this 24-acre area are approximately 200,000 cubic yards of material. Periodic removal of material for maintenance of the bridge span is needed, depending on flood frequency and rate of sediment buildup.

Material would be removed in long, shallow excavations to parallel the active stream channel and follow the existing streambed gradient. The material would be hauled to site 3.4 below, and hauled, processed, and extracted in amounts and configurations


Proposed Road Material Sources
Alternative A
3.1 Spread Creek Bridge Area
3.2 Spread Creek Abandoned Dry Channel
3.3 Upper Spread Creek Channel Area
3.4 Spread Creek Upland Area
Alternative B
1.1 Upper Spread Creek Channel Area, Bridger – Teton National Forest
1.2 Spread Creek Upland Area, Bridger – Teton National Forest
Spread Creek Detail
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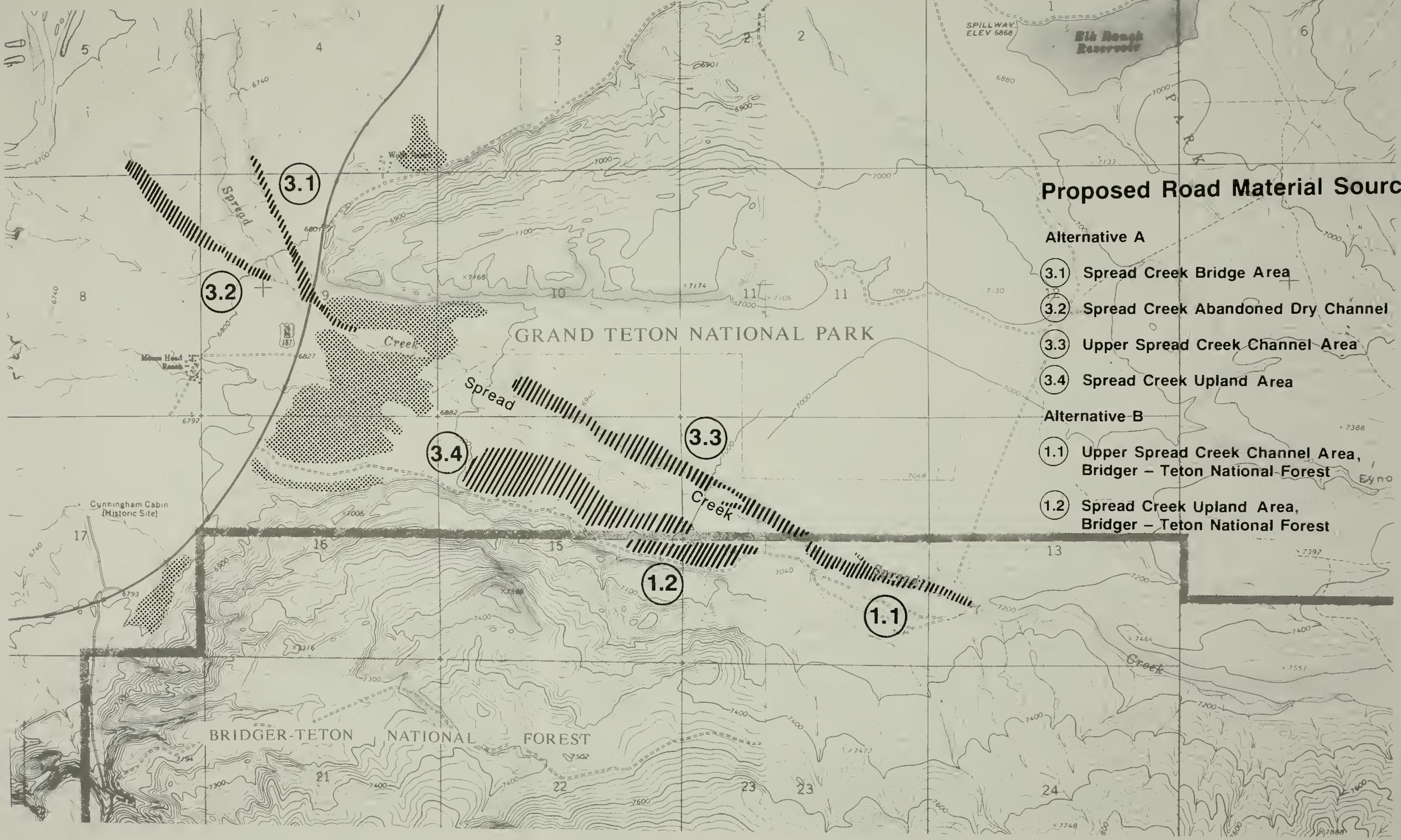
00 Feet



Proposed Road Material Sources

Alternative A

(3.1) Spread Creek Bridge Area

(3.2) Spread Creek Abandoned Dry Channel

(3.3) Upper Spread Creek Channel Area

(3.4) Spread Creek Upland Area

Alternative B

(1.1) Upper Spread Creek Channel Area, Bridger – Teton National Forest

(1.2) Spread Creek Upland Area, Bridger – Teton National Forest

MATERIAL SITE

WETLAND

0 1000 2000 4000 6000 Feet

Spread Creek Detail

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recommended by the hydrological study (Hydrau-Tech, Inc. 1991) to avoid destabilizing the river channel or exceeding the long-term recharge potential. Spread Creek is considered a pilot project for subsequent extraction projects from other similar streams in Grand Teton.

A temporary haul road would be constructed from the highway to the channel extraction area. Material would be processed and stockpiled at site 3.2 or 3.4 below. The existing forest access road that intersects the highway 0.7 mile south of the Spread Creek bridge would be reconstructed for about 1.6 miles to site 3.4 to accommodate heavy equipment operation and the existing public use. Contractor activity would generally occur from July until the beginning of winter to avoid high water conditions and the main summer visitor season. Actual periods of use would be determined on a project-specific basis.

3.2 Spread Creek Abandoned Dry Channel

This 30-acre area is 0.2 mile to 1.0 mile downstream (west) of the East Side Highway bridge and is south of source 3.1. The channel is an abandoned dry channel of Spread Creek that has shifted north at this point due to the gradient of the alluvial fan. Material would be excavated in long, shallow areas (100-300 yards wide) and follow natural landforms. Processing and stockpiling would occur on site. A 0.6-mile access road would be constructed from the Moose Head Ranch (a private inholding) access road north to the excavation/staging area.

3.3 Upper Spread Creek Channel Area

This area is in the high-water channel between the active stream channel and floodplain of Spread Creek. The site begins 0.7 mile upstream of the East Side Highway bridge and extends for 1.7 miles upstream to the park/national forest boundary. This site, entirely within Grand Teton, is north of the existing forest access road. The estimated reserves in this 80-acre area are about 1 million cubic yards. Material excavated from long, shallow areas and processed at site 3.4 below would be extracted in prescribed amounts and configurations recommended by the hydrological study cited above. A short access road would be constructed from the 3.4 processing site to the extraction site. Approximately 1.6 miles of the forest access road, from the highway to the processing site, would be improved to accommodate two-way hauling and other traffic as described under site 3.1 above.

3.4 Spread Creek Upland Area

This area is a flat upland alluvial terrace deposit 1.6 to 2.3 miles east of the East Site Highway and between the national forest access road and Spread Creek. The access road crosses the terrace at the NPS/USFS boundary. This 40-acre area, entirely within Grand Teton, has an estimated reserve of 1 million cubic yards of material.

The site would be used as the primary processing, stockpiling, and reject disposal site for the Spread Creek extraction sources. The initial use of this site could possibly be for

completion of the East Side Highway. Material would be extracted for processing, and a disposal pit would be developed for reject material. Additional material would be extracted from the pit while the channel sites are recharging, providing additional space for reject material from the channel sites.

4. RKO Site

This abandoned borrow site could be used to supply northern Grand Teton. This site is accessed by a gravel road 0.5 mile south of the Signal Mountain summit road intersection and is approximately 0.25 mile east of the Teton Park Road (see RKO site map). Estimated reserves of the site are approximately 1.2 million cubic yards within previously disturbed areas. Material would be extracted over a number of years, with processing, stockpiling, equipment storage, and staging occurring at the site. Site reclamation would be performed in stages on the excavation and staging area.

5. Kelly Site

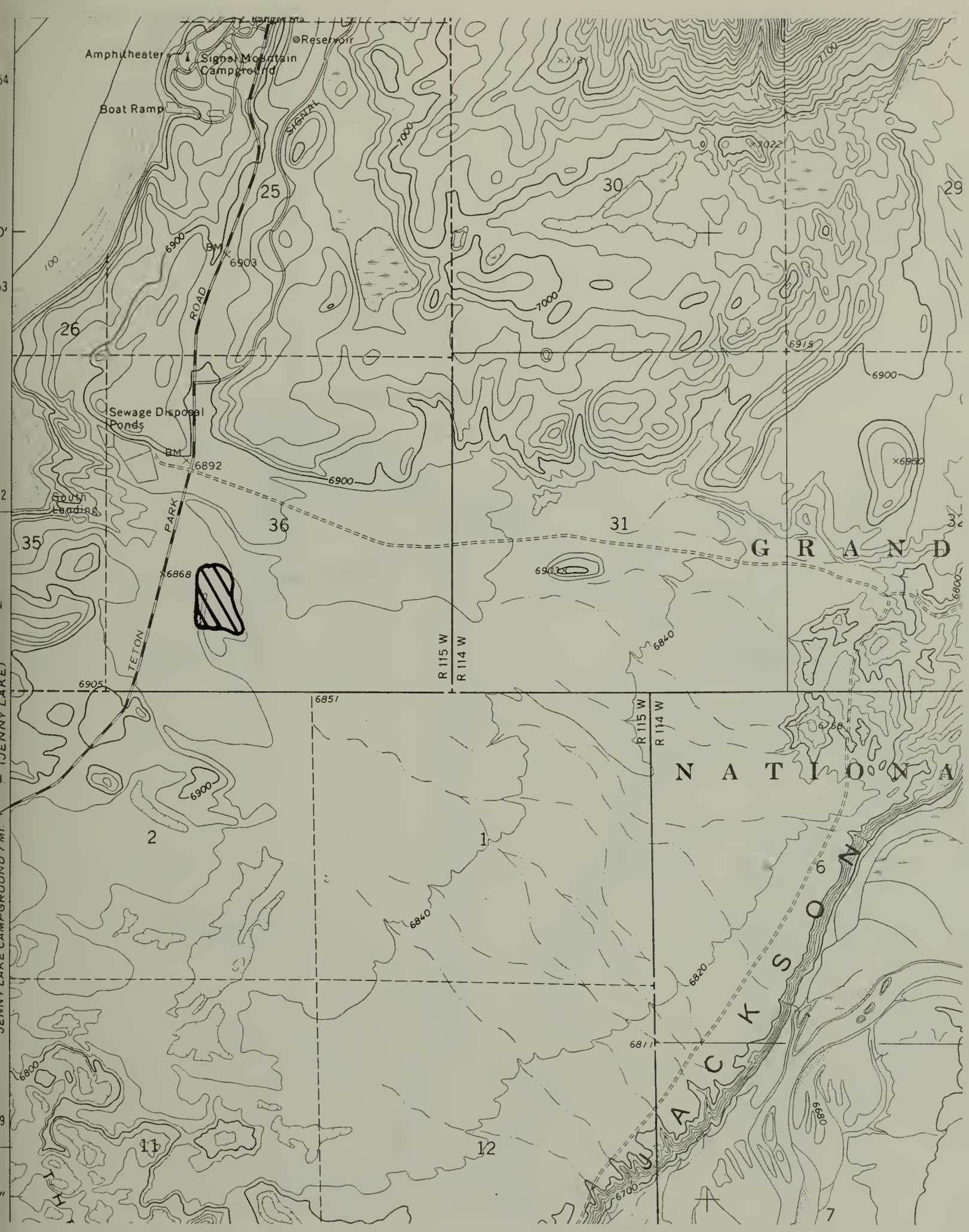
The Kelly borrow site would continue to be used as a maintenance/stockpiling site. The site is 0.3 mile west of Kelly and 0.3 mile south of the Kelly/Gros Ventre road. Reserves in this 25-acre disturbed area are minimal and would only serve small-scale maintenance needs (1,000-2,000 yards). All estimated reserves could be extracted. Material would be extracted from other sites and hauled to this site for processing and stockpiling. This area would also be used for equipment storage and staging. Site reclamation would be performed on approximately 15-20 acres to reduce the disturbed area; however, the access road and a limited area would be retained for long-term use as a maintenance material storage area.

6.0 General Gros Ventre River Area

This area extends along the active river channel from Kelly to the confluence of the Gros Ventre and the Snake rivers (see Alternative A map). Included are privately owned lands and Grand Teton, USFWS, and BLM lands. Two options of material extraction described below might be used in addition to commercial sources to supply the southern portion of Grand Teton.

6.1 Gros Ventre River BLM Lot

This 60-acre site is approximately 0.4 mile upstream (east) of the Spring Gulch road bridge and 1.2 miles downstream of the East Side Highway bridge (see Alternative A and Gros Ventre River BLM Lot maps). Estimated existing reserves in the channel area at this site are 200,000 cubic yards of material, with additional materials accumulating due to bedload recharge. Material would be extracted from a 31-acre area of the river high-water channel, with potential processing and stockpiling on 29 acres south of the river levee. Additional hydrological studies would be needed to determine appropriate quantities and locations of material to be extracted.



RKO Site

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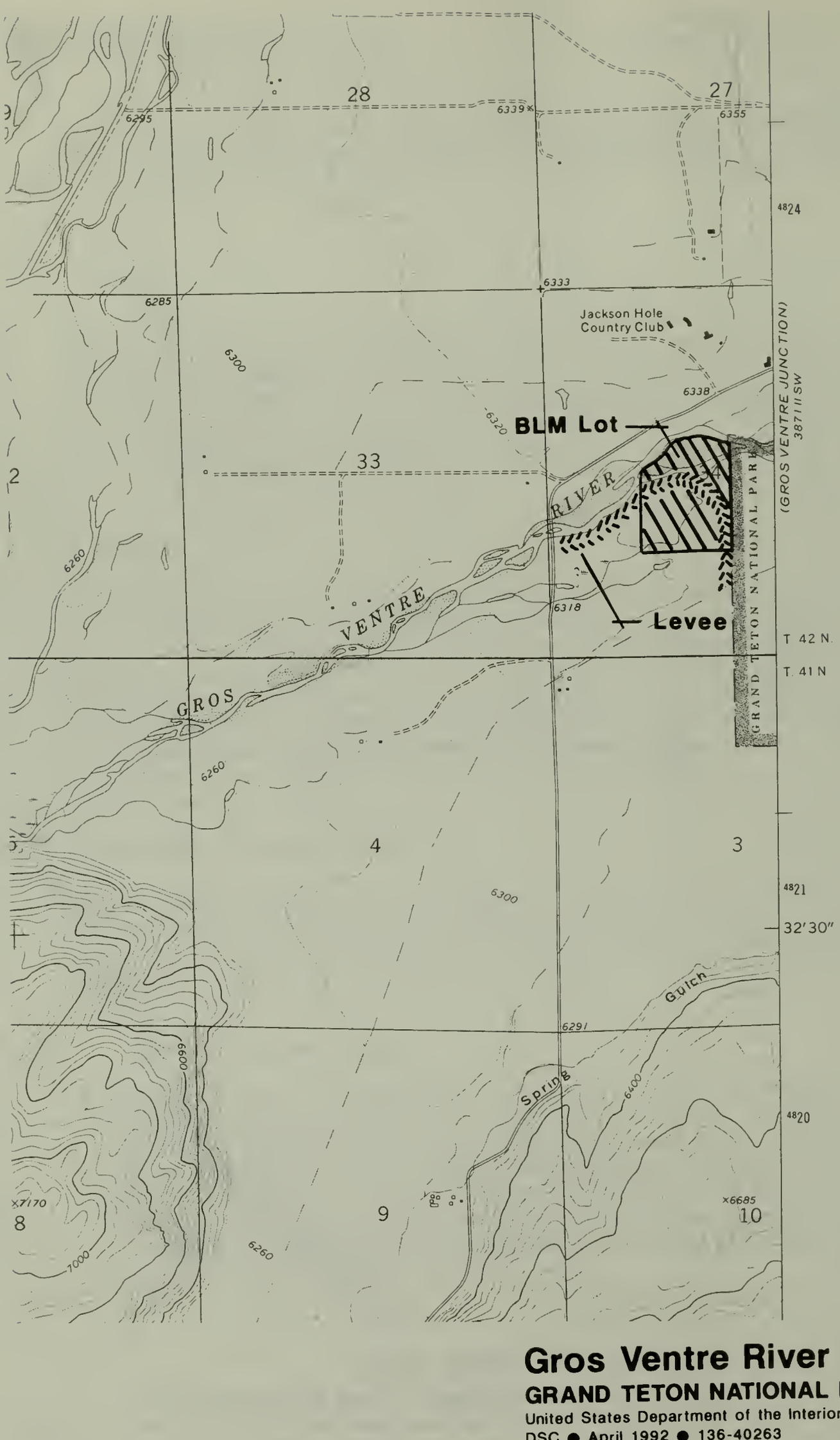

Gros Ventre River BLM Lot

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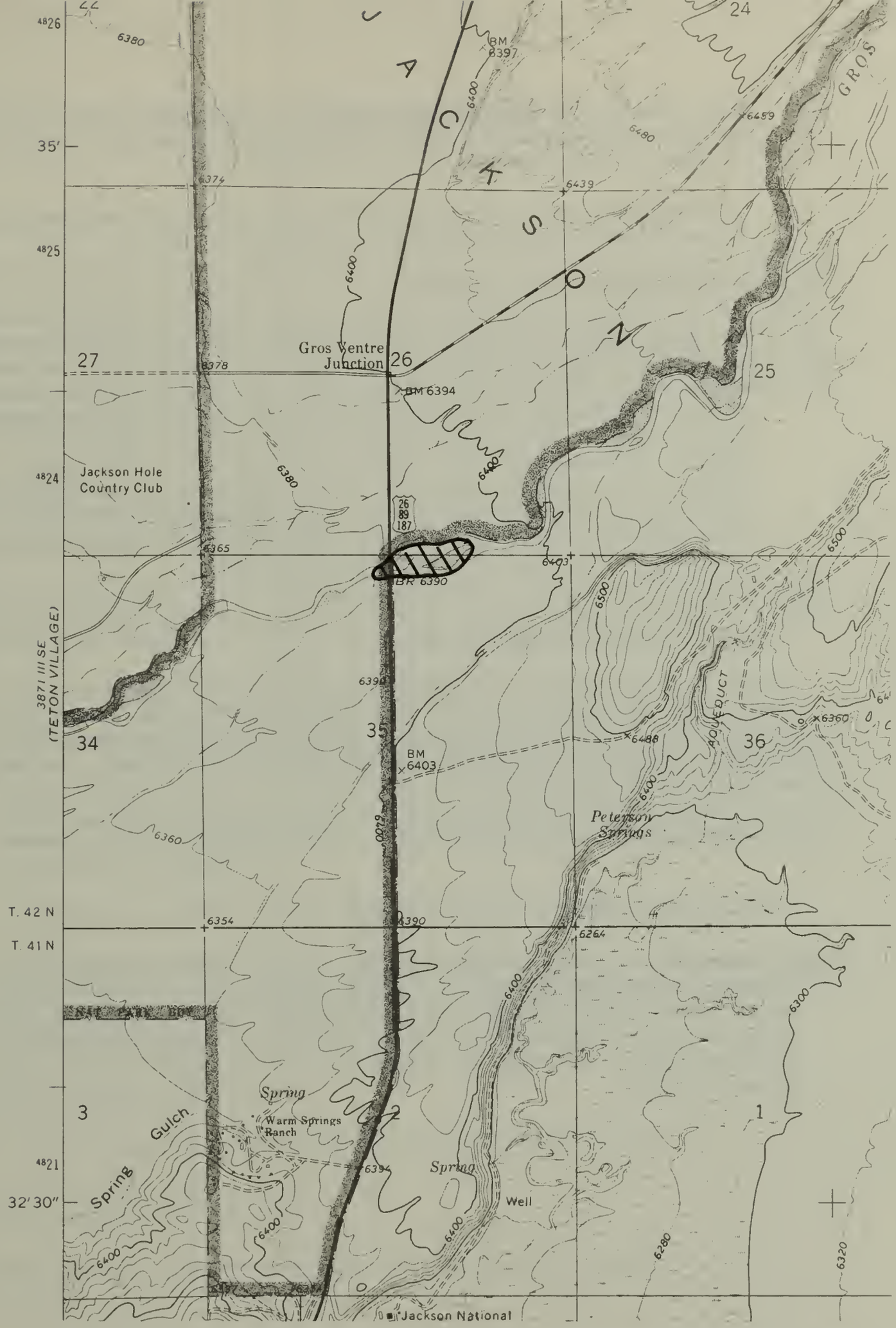

Gros Ventre River Bridge Area

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An alternative to processing on site would be to haul material to either Grand Teton's Blacktail maintenance site or the Kelly site. There are alternative haul routes to both sites. The route would be determined on a project-specific basis.

Site reclamation would remove existing cobble stockpiles, pit walls, and log debris; reslope to more natural contours; and restore the native plant community.

6.2 Gros Ventre River Bridge Area

This site is on Grand Teton (downstream) and National Elk Refuge lands (upstream) at the East Side Highway bridge crossing the Gros Ventre River (see Gros Ventre River Bridge Area map). Material would be periodically removed from the channel at this site to maintain the bridge span upstream and downstream from the bridge. Because of the aggrading nature of channel, gravel is deposited annually at the bridge site. This tends to shift the channel away from the bridge opening upstream. Activity upstream from the bridge would be authorized by the U.S. Fish and Wildlife Service. Current estimated site reserves are approximately 25,000 cubic yards. Material would be removed and hauled to the BLM site or the Blacktail or Kelly maintenance sites for stockpiling/processing, depending on where the processed material was needed.

7. Evans Construction Company Site

This site is 16 miles south of the Grand Teton boundary, south of Jackson on U.S. 26/89/191. Material would be purchased from this commercial material source to supply projects in southern Grand Teton. Estimated reserves are 500,000 cubic yards. Because NPS needs exceed the existing reserves, material would be purchased when available, and other back-up sources would also be used.

Processed material would be hauled over U.S. Highway 26/89/191 through Jackson.

8. Potential Unspecified Commercial Sources

Material would be purchased from commercial sources that might be developed over the next 20 years. The material needs over the next 20 years for southern Grand Teton are approximately 828,000 cubic yards of raw material. Abundant material exists on privately owned floodplain areas of the Snake and Gros Ventre rivers. Some private sites have supplied past state highway contracts, and landowners have expressed interest in developing commercial sources.

ALTERNATIVE B: SOURCES OUTSIDE OF THE PARKS

INTRODUCTION

This alternative would use several sources outside park areas for road materials for Grand Teton, the Parkway, and southern Yellowstone (see Alternative B map). The Federal Highway Administration inventoried all known borrow sites in the study area and evaluated each site for adequate quality and quantity (FHWA 1991). The areas of southern Yellowstone and northern Grand Teton would generally be supplied from sources on USFS lands or from commercial sources when available, and southern Grand Teton would be supplied from commercial sources, when available, or from sources developed on BLM land.

SOURCES

1.0 General Spread Creek USFS Area

Activities at these sites would be similar to alternative A (see Spread Creek Detail map); however, all activity would be confined to USFS land adjacent to Grand Teton. Material would probably be removed from the high-water channel and/or upland terrace sites.

1.1 Upper Spread Creek USFS Channel Area

Material would be extracted from the high-water channel between the active stream channel and the floodplain upstream of the park/national forest boundary, about 2.4 miles upstream from the highway bridge. A short access road would be constructed from the processing site (site 1.2 below) to the channel extraction site. All activities at this site would be similar to alternative A site 3.3. With adequate bedload recharge, this site could be used for several projects.

1.2 Spread Creek USFS Upland Area

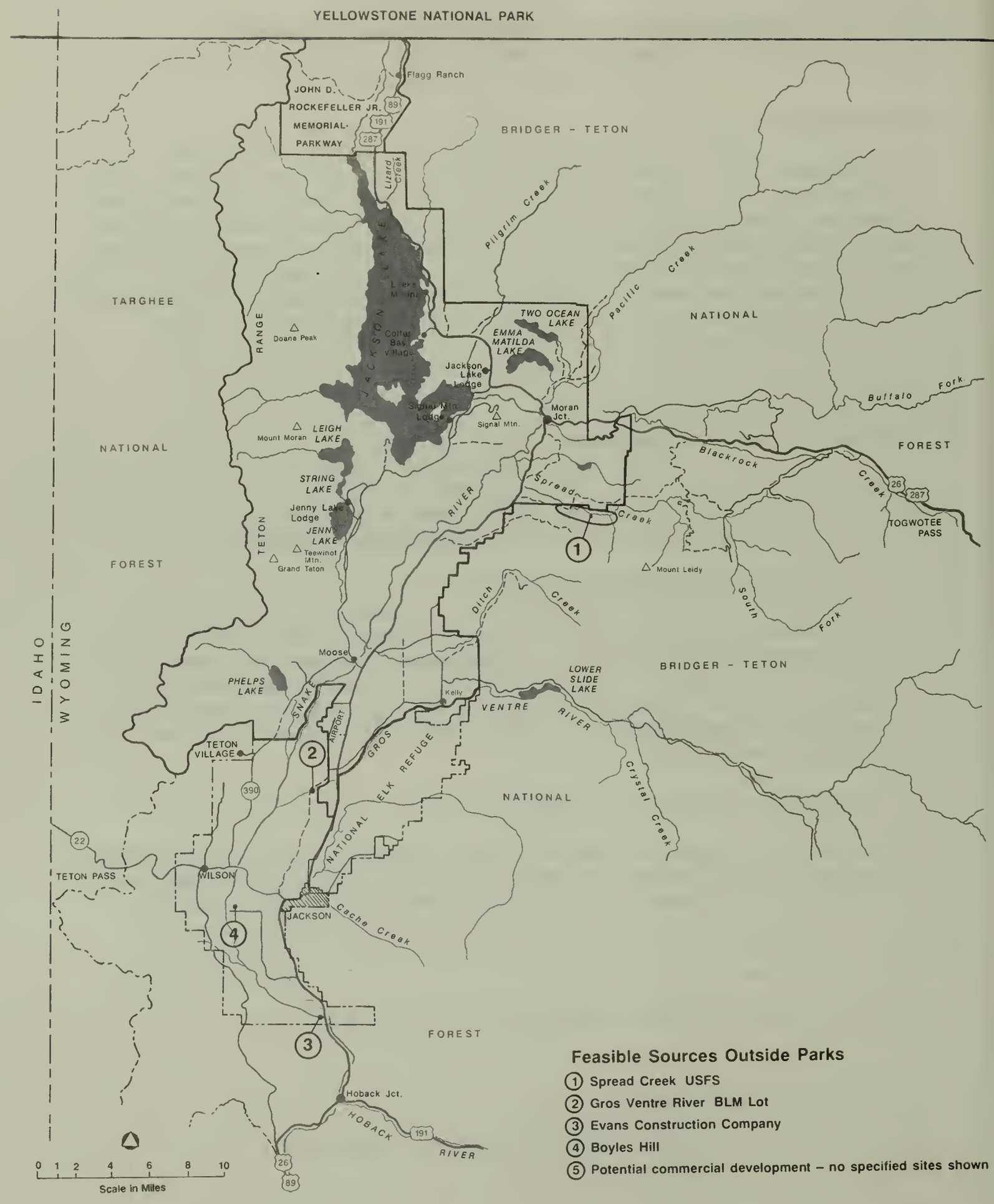
Material would be extracted from the same upland alluvial terrace described under alternative A site 3.4; however, all activity would occur outside of Grand Teton on the Bridger-Teton. This 40-acre area could produce 1 million cubic yards.

2. Gros Ventre River BLM Lot

This site and proposed activities are described under alternative A site 6.1.

3. Evans Construction Company

This site and proposed activities are described under alternative A site 7.



Feasible Sources Outside Parks

1. Spread Creek USFS
2. Gros Ventre River BLM Lot
3. Evans Construction Company
4. Boyles Hill
5. Potential commercial development – no specified sites shown

Alternative B

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4. Boyles Hill Site

This site is about 3 miles west of Jackson and is accessible by county roads.

5. Potential Unspecified Commercial Sources

Material would be purchased from potential commercial sources as described under alternative A.

ALTERNATIVE C: NO ACTION, CONTINUE ROAD PROJECTS WITHOUT A COMPREHENSIVE PLAN

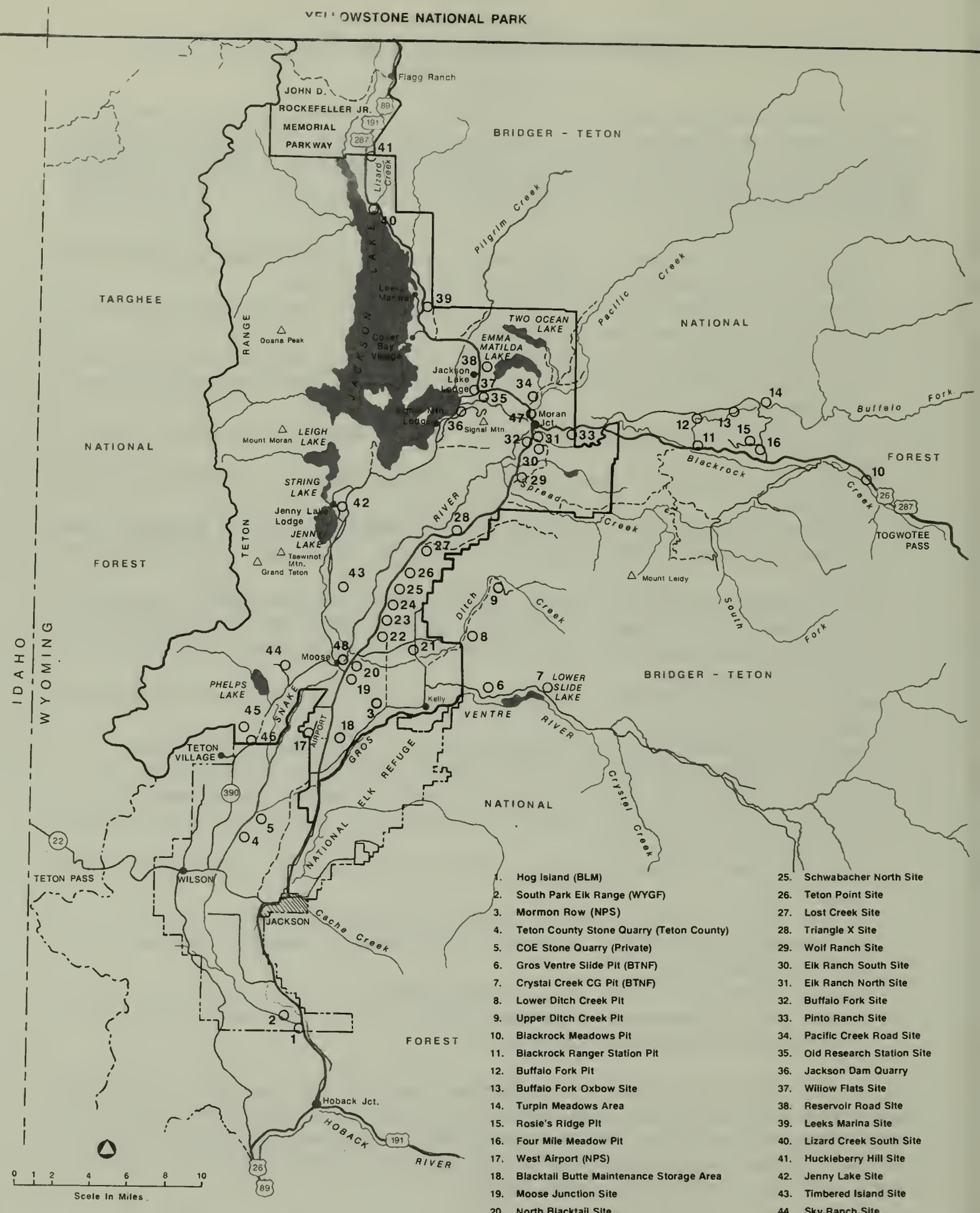
Under this alternative, extraction of materials for the repaving, rehabilitation, and maintenance work described previously would continue on a case-by-case basis without a comprehensive long-term plan. As in the past, project-specific environmental assessments would identify material sources and anticipated impacts. The quantities of materials required would be the same as previously described.

SITES CONSIDERED BUT REJECTED

Several borrow sites in the study area were identified by the Federal Highway Administration and rejected due to inadequate quality and/or quantity of material. The National Park Service reviewed the list of technically feasible sites and rejected additional sites that did not meet the site selection considerations (see Rejected Sites map). The following is a summary of sites and reasons for rejection:

1. Hog Island (BLM). Excavation could potentially redirect the Snake River against the road embankment. Area has been identified for river recreational use.
2. South Park elk range (state land). Past excavation has expended reserves. Area is currently used as an elk winter feeding site.
3. Mormon Row (NPS). This old cultivated site was originally identified as having topsoil available for reclamation projects. The topsoil, however, is contaminated with exotics and is unsuitable for use.
4. Teton County stone quarry (Teton County). Riprap material is unsuitable for paving aggregate.
5. Corps of Engineers stone quarry (private). Riprap material is unsuitable for paving aggregate.
6. Gros Ventre slide pit (USFS). This pit has an inadequate quantity of aggregate-sized material and an excess of fine material. It is also highly visible from the USFS recreation site.
7. Crystal Creek campground pit (USFS). This pit has an inadequate quantity of aggregate-sized material and an excess of fine material. It is also close to the USFS recreation site.
8. Lower Ditch Creek pit (USFS). This site is within an environmental education center research and study area.
9. Upper Ditch Creek pit (USFS). There is an uneconomical quantity of usable material; it is also a sensitive area.
10. Blackrock Meadows pit (USFS). Material is poor in quality and quantity is limited.
11. Blackrock Ranger Station pit (USFS). This pit has been closed and reclaimed.
12. Buffalo Fork pit (USFS). Material is fine, and area is a sensitive riparian environment.
13. Buffalo Fork oxbow pit (USFS). Material is excessively fine sand and silt, and there would be excessive processing costs.
14. Turpin Meadows trailhead pit (USFS). Use of this area would conflict with the USFS recreation site.
15. Rosie's Ridge pit (USFS). Quantity of material would be inadequate.
16. Four Mile Meadow pit (USFS). Material is poor in quality and quantity is inadequate; it is also in a sensitive area.
17. West Airport pit (NPS). Site is near a residential area.
18. Blacktail Butte maintenance storage area (NPS). This site, previously used for borrow, is now used as a storage and staging site.

Another 30 Grand Teton pits shown on the Rejected Sites map have been rejected due to their location near main park roads, in visitor contact or scenic areas, or because they would cause unacceptable and unmitigable resource impacts. All of these sites existed prior to 1970, and some were active prior to 1950. Most sites have regrown with native vegetation and are not readily visible to the public due to terrain features.



1. Hog Island (BLM)
2. South Park Elk Range (WYGF)
3. Mormon Row (NPS)
4. Teton County Stone Quarry (Teton County)
5. COE Stone Quarry (Private)
6. Gros Ventre Slide Pit (BTNF)
7. Crystal Creek CG Pit (BTNF)
8. Lower Ditch Creek Pit
9. Upper Ditch Creek Pit
10. Blackrock Meadows Pit
11. Blackrock Ranger Station Pit
12. Buffalo Fork Pit
13. Buffalo Fork Oxbow Site
14. Turpin Meadows Area
15. Rosie's Ridge Pit
16. Four Mile Meadow Pit
17. West Airport (NPS)
18. Blacktail Butte Maintenance Storage Area
19. Moose Junction Site
20. North Blacktail Site
21. Mailbox Corner Site
22. Rudd Site
23. Glacier View Site
24. Schwabacher Road Site
25. Schwabacher North Site
26. Teton Point Site
27. Lost Creek Site
28. Triangle X Site
29. Wolf Ranch Site
30. Elk Ranch South Site
31. Elk Ranch North Site
32. Buffalo Fork Site
33. Pinto Ranch Site
34. Pacific Creek Road Site
35. Old Research Station Site
36. Jackson Dam Quarry
37. Willow Flats Site
38. Reservoir Road Site
39. Leeks Marina Site
40. Lizard Creek South Site
41. Huckleberry Hill Site
42. Jenny Lake Site
43. Timbered Island Site
44. Sky Ranch Site
45. Snake River Ranch North (Private)
46. Snake River Ranch Granite (Private)
47. Pacific Creek Bridge Area
48. Moose Landing

Rejected Sites

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AFFECTED ENVIRONMENT

INTRODUCTION

NATURAL ENVIRONMENT

A general description of the study area is provided below for the reader's orientation. Specific site information follows these general descriptions.

Air Quality

Air quality and visibility in the area are generally excellent, although occasional periods of haze or smoke of local and interstate origin occur throughout the year. Grand Teton and the Teton Wilderness are mandatory class 1 areas where air quality degradation is unacceptable under the Clean Air Act of 1977. The remaining portion of the Bridger-Teton National Forest in the study area is a class 2 area.

Landforms

The Jackson Hole is bordered on the west by the north-south trending Teton Range, on the north by the Yellowstone Plateau, on the northeast by the Pinyon Peak Highlands and Absaroka Range, on the east by the Gros Ventre Mountains, and on the south by the Snake River Range. The Grand Teton is the highest summit in the area at 13,770 feet above sea level, rising above the flat valley floor of 6,000-7,000 feet elevation. The Snake River flows along the southern edge of the Yellowstone Plateau, drains south through Jackson Hole, and then west into Idaho. Major tributaries of the Snake within Grand Teton are Pilgrim, Pacific, and Spread creeks, Buffalo Fork, and the Gros Ventre River. Downstream of the park are the tributaries of Flat and Fish creeks and the Hoback River.

Geology

This area is still geologically active. Some of the rock of the Teton Range is among the oldest exposed on the continent; however, the Teton Range is one of the youngest ranges in the Rocky Mountains. Ice-age glaciers sculpted horn-shaped peaks, U-shaped canyons, and valley basins now occupied by lakes at the base of the Teton range. The glaciers also deposited material that formed moraines, pothole kettles, and other ice-related features. Streams from melting glaciers further transported and redeposited great quantities of outwash material. The subsiding Jackson Hole floor became a sediment trap and filled with alluvial material, up to 10,000 feet deep, during several cycles of glacial advance and retreat. The material is predominantly durable quartzite pebbles and cobbles eroded from mountains to the north and northwest that no longer exist.

Yellowstone Plateau to the north is of recent volcanic origin. The geologic substrate of southern Yellowstone and the Parkway is highly variable in both particle size and deposition patterns because of depositions of ash and larger articles from past volcanic eruptions. The geologic parent material also has a high feldspar content that weathers into clay.

The northeastern highlands of the Buffalo Fork drainage in the Bridger-Teton are a mixture of volcanic deposits, soft sedimentary beds, and substantial outcrops of the Harebell and Pinyon formations, which are conglomerates of durable quartzite pebbles and cobbles embedded in soft sandstone. Before widespread erosion and removal by glaciation, these formations were up to 10,000 feet thick. Occasional deposits of quartzite pebbles and cobbles are found in the highlands; however, these few generally shallow lenses eroded out of the matrix. Most of the material was transported by streams into Jackson Hole and deposited on the flats of Grand Teton National Park.

The Gros Ventre Mountains in the Bridger-Teton east of the park are predominantly sedimentary sandstones, shales, and silt formations. Most of the sedimentary rock formations are soft and degradable.

Sediment Transport by Streams

The process of streams transporting and depositing alluvial material still occurs. The highlands of the Teton Wilderness and Gros Ventre Mountains east of the valley are prone to erosion and slumping, with Pilgrim and Spread creeks and the Gros Ventre River cutting through slide areas and transporting large quantities of alluvial material down into Jackson Hole (USFS 1971). As streams reach the valley floor, gradients flatten, water velocity slows, and sediment (including sand, pebbles, and large cobbles) settle out. As sediment settles, channels become blocked, causing stream channels to shift laterally. The process repeats itself, building up deposition areas characterized by braided channels and wide flood channels of pebble/cobble material. Examples of this in Grand Teton are Pilgrim, Pacific, and Spread creeks, Lower Buffalo Fork, and the Gros Ventre River (Skinner 1976).

As sediment deposits build up in the channels under highway bridges in Grand Teton and elsewhere in Jackson Hole, material has to be periodically removed to maintain the channel and prevent destabilization of bridge abutments or creation of a new channel around existing bridges. This work is routinely performed at the Snake River bridge at Wilson, the Gros Ventre River bridges, and the Spread, Pacific, and Pilgrim creek bridges.

Water Quality, Floodplains, and Wetlands

Area waters are noted for pristine quality and are extremely important to both the natural environment and the regional economies of downstream areas. The Wyoming Department of Environmental Quality has designated the Snake River upstream of the State Highway 22 (WY 22) bridge as class 1 waters and the river below the bridge as class 2. Gros Ventre River, Buffalo Fork, and Spread, Pacific, and Pilgrim creeks are designated class 2 waters. In both classes, increased degradation by point sources is not allowed to exceed 10 turbidity units above natural conditions. As described earlier, the high-gradient tributary streams of the Snake River carry high loads of suspended sediment during spring flooding.

Unclassified floodplains are identified by vegetation and soil type. Channels along the high gradient are typically broad expanses of gravel and cobble, with little soil or vegetation. Unstable and frequently shifting stream channels with numerous gravel bars keep these areas

relatively barren of vegetation. The Gros Ventre River, Spread Creek, and Pilgrim Creek are examples of such streams.

The floodplains of low-gradient streams are generally more stable and typically have willow and cottonwood plant communities along the riparian zone. Spring-fed ponds, sloughs, and creeks along the larger streams provide stable, productive wetland habitat that supports willows and other emergent vegetation.

Soils And Vegetation

Soils of the upland flats of Grand Teton consist of well-drained gravelly, cobbly, sandy-loams deposited by post-glacial streams. These soil types have a high percolation rate and support a sagebrush-steppe plant community. Common plants on the upland flats are bluebunch wheatgrass, Idaho fescue, arrowleaf balsamroot, lupine, gilia, wild buckwheat, big sagebrush, low sagebrush, rabbitbrush, and antelope bitterbrush. Valley floor areas to the south have a higher portion of finer soils and support a wheatgrass/needlegrass shrub-steppe plant community.

Floodplain areas along low-gradient, more stable streams have finer, silty soils and support floodplain forests, and wet meadows. Typical species are narrowleaf cottonwood, black cottonwood, willow, aspen, blue spruce, tufted hairgrass, sedges, and various forbs.

Wetland plant communities in the area are diverse. Riparian wetlands may consist of willow fields, grading into wet meadows of beaked sedge, rushes, and tufted hairgrass. Wetlands supporting willows, rushes, cattails, grasses, and sedges occur adjacent to moraine pothole ponds, seeps and springs, and along the more stable stream channels.

Conifer forest areas at the base of the Teton Range typically occupy moraines deposited by retreating glaciers. Moraine soils retain more moisture than soils of sagebrush flats because of a higher proportion of fine particles. Moraines support forests of lodgepole pine, subalpine fir, Engelmann spruce, and Douglas fir on drier sites. Understory plants include pine grass, elk sedge, harebell, mule's ear, grouse whortleberry, and huckleberry.

Forested slopes on the east side of Jackson Hole on the Bridger-Teton support the same species but with greater occurrence of spruce and aspen.

An increasing concern in the area is nonnative vegetation, which frequently occurs on old farm lands, along roadsides, or on sites disturbed by construction. Spotted knapweed, musk, Canada thistle, toadflax, and wooly mullein are species of concern.

Threatened and Endangered Species

No federally listed threatened or endangered plant species exist in the area.

Four animal species listed under the Endangered Species Act of 1973 occur in the study area. The bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), and the

whooping crane (*Grus americana*) are listed as endangered. The grizzly bear (*Ursus arctos horribilis*) is listed as threatened.

Over a dozen bald eagle pairs reside year-round from above Jackson Lake down the Snake River to Alpine, as well as along the Buffalo Fork River. An additional 50 migrants may pass through Grand Teton during the spring and fall. All streams with good fish habitat are important to eagle foraging. Eagles also forage on waterfowl and carrion. From 1960-82, the bald eagle population of the entire greater Yellowstone area appeared to be stable or increasing (Swenson et al. 1986). Bald eagles are often sensitive to human activity near nests from late winter through early summer. Areas in Grand Teton within 0.5 mile of a nest are posted closed to entry on foot.

Peregrine falcons have been observed in the study area during spring, summer, and fall. Falcons were reintroduced into the mountainous canyons of Grand Teton and several sites in Teton County outside the park. Peregrines generally forage within 3 miles of their nest but will travel up to 17 miles. They forage primarily on waterfowl populations.

Whooping cranes are occasionally observed in the study area during spring, summer, and fall. Sandhill crane habitat is considered potential whooping crane habitat by the U.S. Fish and Wildlife Service because the birds nest and forage together. Important habitats are seasonal and permanent wetlands, including tall emergent vegetation, open water marshes, ponds, upland deciduous and conifer edges, sage-grass fields, upland grass-forb meadows, irrigated hayfields, and grainfields (Lockman and Drewein 1985). Cranes are most vulnerable to disturbance during April and May.

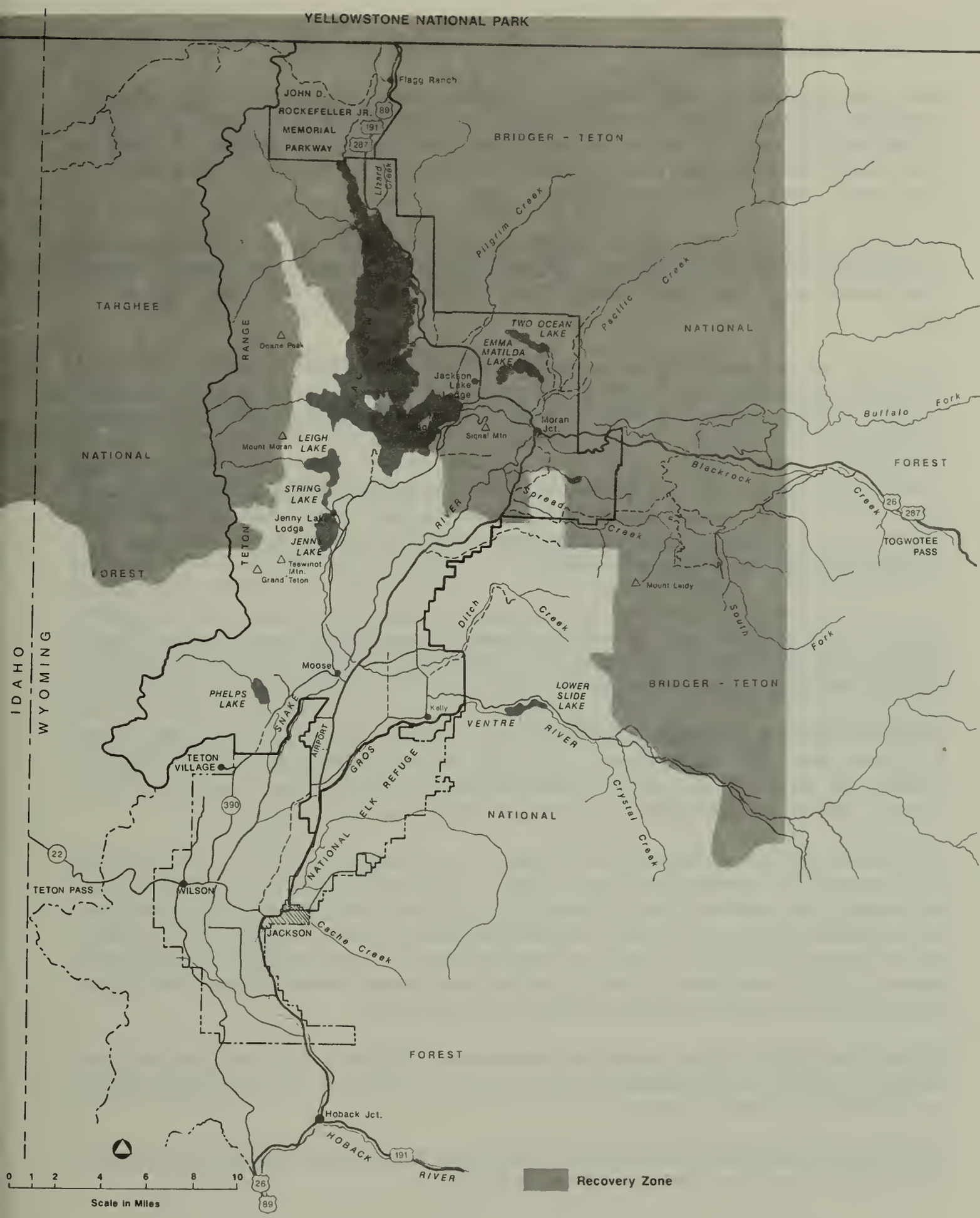
Grizzly bears inhabit the mountainous and remote portions of the study area. Sightings have occurred in the northern portions of Grand Teton, throughout southern Yellowstone, the Parkway, the Teton Wilderness, and portions of the northern Gros Ventre Mountains on the Bridger-Teton.

Public lands with suitable grizzly bear habitat have been designated as recovery zones (USFWS 1990)(see Grizzly Bear Recovery Zone map). Human activities on public lands within the recovery zone are subject to review under the Endangered Species Act to ensure they will not detrimentally affect the grizzly populations.

Species of Special Management Concern

The trumpeter swan and lynx are species of special management concern in Grant Teton and Wyoming. Both year-round resident swans and winter migrants occupy the area. Grand Teton has an average of six nesting paris and up to 40 wintering pairs. Swans require a long season for the young to fledge, and the area's severe climate probably makes this marginal range.

The common loon, osprey, American white pelican, harlequin duck, and Caspian tern are also present and of special management concern in Grand Teton due to low population levels.



Grizzly Bear Recovery Zone

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Other Wildlife Species

Native fish species in the study area include the Snake River cutthroat trout, Rocky Mountain whitefish, Utah sucker, Utah chub, sculpin, dace, and redside shiner. Nonnative lake, brook, brown, and rainbow trout have been introduced into area waters. Besides providing for sportfishing, fish populations are an important component of the food chain and are food for bald eagles, osprey, grizzly bear, otter, and others.

Cutthroat spawning takes place in the early summer and requires clear water and silt-free gravel beds. Spring creeks and some tributary streams provide important spawning habitat. The Snake River is used by some fall spawning species (e.g., white fish and brook and brown trout).

Some streams in Grand Teton have relatively low aquatic food chain productivity, due to low flows and poor habitat. Pilgrim and Spread creeks and the Gros Ventre River are examples of this, with frequently shifting or dry channels, unstable banks, and few "holes" to provide resting spots for larger fish.

The cold climate of the general area limits numbers of amphibian and reptile species. Common and western garter snakes; rubber boas; spotted, leopard, and chorus frogs; and tiger salamanders are mostly found along floodplains of the Snake River, Buffalo Fork, and Gros Ventre River below 8,000 feet in elevation.

Over 300 species of birds occur in the study area, including white pelican, great blue heron, sandhill crane, trumpeter swan (a sensitive species), Canada goose, golden and bald eagle, red-tailed hawk, sage grouse, raven, gray jay, Clark's nutcracker, several species of woodpeckers, and various songbirds.

At least 54 mammal species inhabit the study area. The most common species are elk, moose, pronghorn (antelope), bison, mule deer, Uintah ground squirrel, golden-mantled ground squirrel, red squirrel, deer mouse, snowshoe hare, porcupine, beaver, and coyote. Less common species are black bear, river otter, pine marten, and mountain lion.

Elk generally spend summers and fall in uplands surrounding Jackson Hole. Late fall storms force elk down to lower elevation winter ranges on the valley floor and lower foothills where snow depths are moderate. Elk pass through Grand Teton and the Parkway and the Gros Ventre foothills of the Bridger-Teton during fall and spring on their way to and from wintering on the National Elk Refuge. Elk also use floodplain forests as well as forested lower mountain slopes on a year-round basis. Elk calving occurs in May-June in foothills of Grand Teton's east boundary and forested areas south and east of Jackson Lake.

Moose inhabit both floodplain forests and upland areas in Grand Teton forest. Pronghorn use sagebrush flats in the park during the summer and fall, then move out of the valley to winter west of the Wind River Mountains.

During the summer bison generally forage along the river floodplains and sagebrush flats of Grand Teton. They winter on the National Elk Refuge.

CULTURAL RESOURCES

Native Americans first seasonally inhabited Jackson Hole and southern Yellowstone about 8,000-10,000 years ago. Archeological sites provide evidence of hunting and gathering camps and obsidian gathering areas. Known sites are usually near fishing, hunting, or plant-gathering opportunities. Comprehensive surveys of alternative sites have not been completed at this time.

Grand Teton has a number of rustic buildings associated with early pioneering, dude ranching, private estates, and USFS administration that predate the establishment of the national park in 1929. None of these structures are within the affected site areas.

COMMUNITY AND ECONOMIC CONDITIONS

The economy of Teton County is dominated by tourism, although ranching, timber production, government, and regional merchandise sales are also important. The county is experiencing appreciating real estate values, with a residential and commercial building boom. National and international visitors are drawn to Grand Teton and forest areas and private developments in the county.

Traffic on area roads has several purposes, including local, recreational (sight-seeing and hunting), and interstate commercial traffic. Recreation constitutes much of the traffic year-round.

Within the Grand Teton boundary concessioners provide public services under contracts administered by the National Park Service. The following concessioners are near affected sites: Triangle X Dude Ranch (Spread Creek sites), Signal Mountain Lodge (RKO site), and Flagg Ranch (Snake River Pit). The privately owned Moose Head Ranch is near the Spread Creek sites.

ALTERNATIVE A SITES

1. SNAKE RIVER SITE

Location

The Snake River site is within the Parkway, 0.6 mile west of the north entrance road and 0.8 mile south of the Snake River highway bridge at Flagg Ranch (see Alternative A and Snake River Site maps).

Management History

This gravel pit was opened under a USFS permit in the early 1960s and has been in continuous use since. The site is a designated material site in the Parkway's *General Management* Plan (NPS 1980), and has been used as a borrow site and a processing/ stockpiling operation to support road construction and maintenance projects for Grand Teton, the Parkway, and Yellowstone. The site is identified as a "special use subzone" for gravel extraction in the Parkway's *Statement for Management* (NPS 1989).

Natural Environment

The 65-acre site consists of two borrow pits. The smaller pit, an upland site completely surrounded by lodgepole pine forest, is less than 5 acres and is used as a disposal site. The large pit is within the Snake River 100-year floodplain. Several excavations in this site have filled with groundwater; however, there is no direct surface drainage from the ponds into the river. Some soil was salvaged and stockpiled, with remaining soil compacted and disturbed by heavy equipment traffic and excavation. The substrate is alluvial gravel/cobble material overlain by 3-6 feet of peat and loam. Vegetation is absent in most of the site. Off-site vegetation east of the disturbed area is lodgepole pine, and the rest of the surrounding area is a mosaic of wet meadows and shrub-scrub wetland. Hawks and waterfowl, including ducks, geese, and swans, use the surrounding wetlands. Elk, moose, smaller mammals, and perching birds also use the area. Bald eagles nest and roost over 5 miles away and forage in the immediate area. Peregrine falcons nest within 2 miles, and sandhill cranes nest and forage in the wetlands, which are also considered potential whooping crane habitat. Grizzly and black bears pass through the area, and the area is in the grizzly bear recovery zone.

Cultural Resources

There are no known archeological sites in the immediate area, however, previous surveys do not meet the *Archeology and Historic Preservation; Secretary of the Interior's Standards and Guidelines* (*Federal Register*, 9/29/83, vol. 48, no. 190, p. 44716). The project area has an unknown potential for archeological sites. No historic structures are in the area.

Social and Economic Conditions

The site is 0.2 mile from the main parkway road, visible from the Ashton-Flagg road, and immediately adjacent to the Snake River. For visitors traveling through these areas the site is partially visible. The Flagg Ranch resort concession 1 mile to the north, provides restaurant, lodging, camping, store, and gas station facilities.

2.1 PILGRIM CREEK CHANNEL AREA

Location

This area in Grand Teton is up and downstream of the Pilgrim Creek bridge and the north entrance road between Jackson Lake Lodge and Colter Bay. The project area would potentially extend from 1.5 miles downstream of the bridge to 2.2 miles upstream of the bridge (see Pilgrim Creek Area map).

Management History

Bridge maintenance operations have periodically removed sediment, beginning in the 1960s when the bridge and road were constructed. The Bureau of Reclamation periodically maintains a series of dikes that were constructed in 1938 to protect the north embankment of Jackson Lake Dam. The area was evaluated as a borrow source for the Jackson Lake Safety of Dams Project in 1985 but was not used. The area is within the "resource utilization subzone" as described in Grand Teton's *Statement for Management* (NPS 1985).

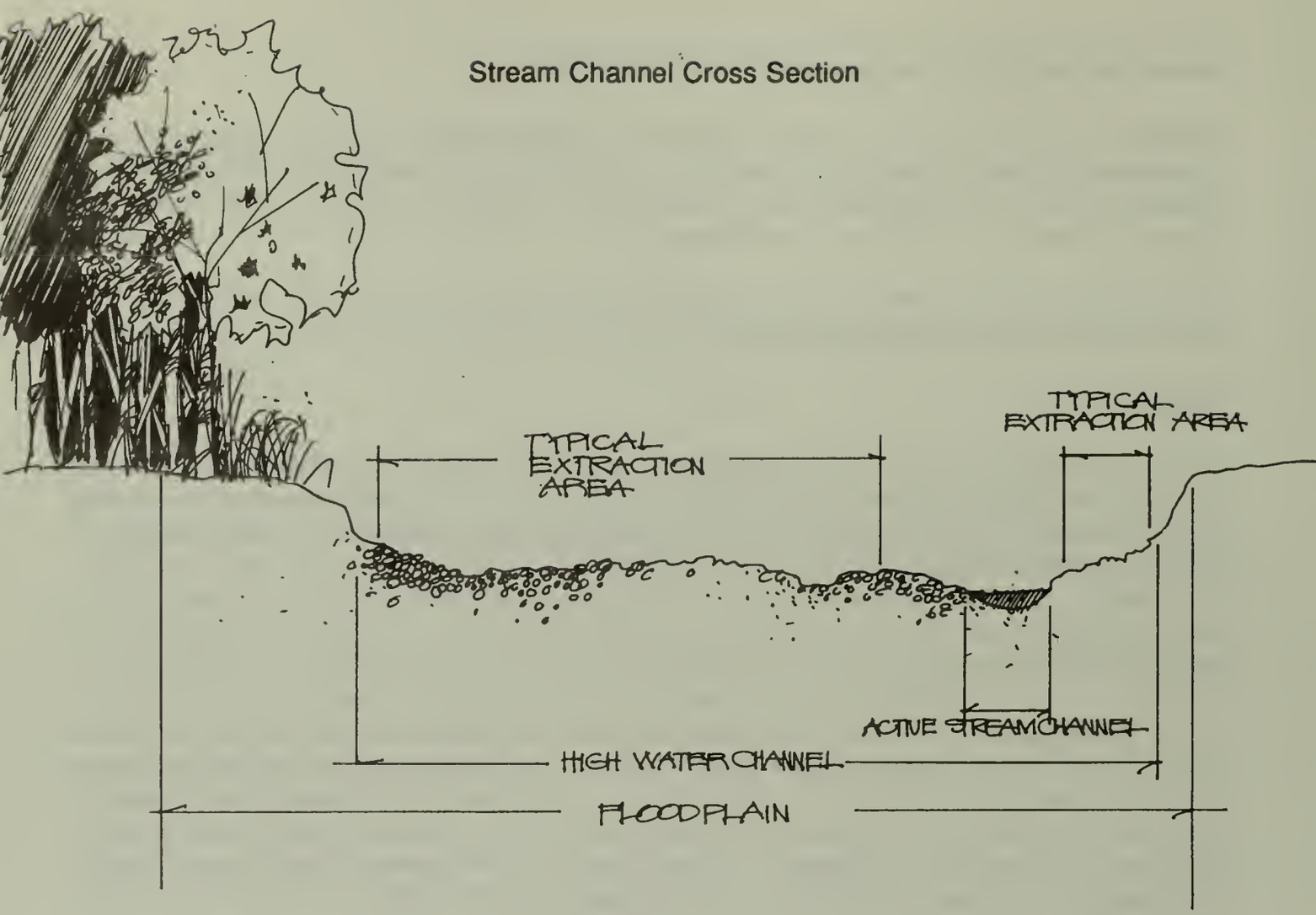
Natural Environment

The project area is between the active channel and the floodplain in the high-water channel (see stream channel cross section). Pilgrim Creek originates on the steep highlands of the Bridger-Teton. Where the streambed crosses the park/national forest boundary, the streambed gradient flattens, the water velocity decreases, and sediment deposition increases. Stream banks are often poorly defined, and the stream spreads into a broad (100-200 yard wide) channel with numerous gravel bars and shifting channels. Base flows are approximately 15 cfs (cubic feet per second), and the creek often appears dry.

Vegetation within the channel is sparse, with large expanses of predominantly bare gravel/cobble material and a few isolated cottonwoods. The adjacent floodplain is spruce/cottonwood forest. The only wetlands occur downstream of the project area, south of the Bureau of Reclamation dikes. The stream nearly dries up at the bridge in late summer due to percolation through the streambed. Fish habitat is poor due to channel instability and low flows.

There is little waterfowl use due to unstable stream conditions and low flows. Elk migrate through and spend the summer in the adjacent area. Moose and various birds and small mammals use the adjacent spruce/cottonwood habitat.

Stream Channel Cross Section



Other than transitory passage, there is no known or expected use by peregrine falcon, whooping crane, or grizzly bear; however, the Third Creek bald eagle nest is about 1 mile southwest of the south end of the channel site. The area northeast of the highway is within the grizzly bear recovery zone.

Cultural Resources

There are no known archeological sites in the area, but surveys conducted in the vicinity do not meet the secretary's standards (see site 1. above). The project area has an extremely low potential for archeological sites due to annual flooding and sediment deposition. No historic structures are in the area.

Social and Economic Conditions

The project area within 200-300 yards of Pilgrim Creek bridge is visible to park visitors from a 0.2-mile portion of the highway. The area is not visible from other public facilities, including Colter Bay Village and Jackson Lake Lodge. No commercial developments are in the area.

2.2. PILGRIM CREEK ROAD SITE

Location

The Pilgrim Creek road site in Grand Teton is 0.1 mile east of the North Entrance Road and immediately south of the Pilgrim Creek national forest access road (see Pilgrim Creek Area map).

Management History

Three existing borrow sites totaling 11.7 acres, near Pilgrim Creek road and within 0.2 mile of the highway, were excavated for road construction material in the 1960s and earlier. No restoration was performed on the pits.

Natural Environment

The road crosses a typical upland sagebrush shrub-steppe plant community of big and low sage, forbs such as lupine and wild buckwheat, and grasses. There are no stream crossings or wetlands. Groundwater floods the floor of one abandoned borrow pit to a depth of 6 feet during spring; however, the pit dries out during summer. Clumps of willow and forbs have colonized the pit sides, but vegetation is sparse on the pit floor due to the depth of inundation. Conifer and cottonwood forest occur along the edge of the stream. Topsoil on undisturbed sites is thin sandy loam, with a substrate of gravel/cobble material. Uintah ground squirrel and other rodents, coyote, badger, hawks, and other birds and mammals that dwell on open shrub habitat use the site. Elk migrate through the area and also summer here. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, or whooping crane. The area is immediately outside of the grizzly bear recovery zone and is a natural travel route.

Cultural Resources

No known archeological sites are in the area, but as indicated above the surveys conducted in the area do not meet the secretary of the interior's standards. No historic structures are in the area.

Social and Economic Conditions

Use of the national forest access road and trailhead is light, and most traffic is during the fall for elk hunting in Grand Teton and the Teton Wilderness. Two of the smaller abandoned borrow sites (0.6 and 1.3 acres) are visible from the park road; however, they are not obvious because they are depressions. The largest abandoned site (9.8 acres) is partially screened from the north entrance road by deciduous trees but is visible from the national forest access road. No commercial developments are in the area.

3.1. SPREAD CREEK BRIDGE AREA

Location

The project area is adjacent to the East Side Highway bridge. The area follows the active river channel from 0.7 mile downstream to 0.3 mile upstream of the bridge (see Spread Creek Detail map).

Management History

Material has been periodically removed from the stream to maintain the bridge opening since construction of the highway in the 1950s. A total of 5,000-10,000 cubic yards have been removed in the past 10 years due to flood deposition. Dikes and gabions (wire baskets filled with rocks) have been constructed on the upstream banks to prevent channel shifting and erosion of the north bridge abutment.

A hydrological study of the stream was made, analyzing the predicted effects of three scenarios of material extraction (Hydrau-Tech Inc. 1991). See "Environmental Consequences" section for results.

The area is within the resource utilization subzone as identified in Grand Teton's *Statement for Management* (NPS 1985).

Natural Environment

The project area would be within the high-water channel (see stream channel cross section). The highway bridge crosses the creek at the top of an alluvial fan. Below the bridge the stream gradient flattens, stream velocity decreases, and sediment deposition increases. Stream banks are poorly defined, and the stream spreads out into a relatively broad gravel/cobble-covered floodplain of gravel bars and multiple shifting channels. Sediment deposition and channel shifting have prevented most vegetation growth and created a channel width of 100-500 feet. Due to upstream irrigation diversion and percolation, Spread Creek often dries up in late summer near the bridge. Wetlands occur just outside the perimeter of the project area upstream of the bridge.

Soil is essentially nonexistent in the project area due to annual flooding, and surface material consists of stream-deposited gravel and cobbles. Vegetation on the adjacent floodplain consists of cottonwood, spruce, willow, and grass and forbs.

Wildlife habitat along the project area in the channel is poor due to lack of vegetation. Fishery habitat is poor due to unstable stream conditions and low flows. There is little waterfowl use due to lack of ponds and other suitable habitat. Elk pass through the area during spring and fall migrations. Elk calving may occur in the general area during spring.

There is no known bald eagle use of the area due to little or no foraging habitat. The nearest bald eagle nest is over 3 miles away along the Snake River. There is no known or suspected peregrine falcon use of the area due to poor foraging habitat. Nearby wetlands outside the

project area provide potential sandhill and whooping crane habitat, with no known use. There is no known grizzly bear use of the area, and the area is outside the grizzly bear recovery zone.

Cultural Resources

No known archeological sites in the area, and no surveys meeting the secretary's standards (see site 1. above) have been made. The project area has an extremely low potential for archeological sites due to past flooding and sediment deposition. No historic structures are in the area.

Social and Economic Conditions

The project area along the active stream channel would be visible to park visitors as they drive the East Side Highway crossing the Spread Creek bridge. The Moose Head Ranch is a privately owned dude ranch 0.5-0.6 mile (straight-line distance) southwest of the project area. Trucks hauling material to an upland processing site (site 3.4 below) would turn onto and travel 0.8 mile of the East Side Highway.

3.2. SPREAD CREEK ABANDONED DRY CHANNEL

Location

This project site in Grand Teton would begin approximately 0.2 mile west of the Spread Creek bridge and extend 1.0 mile northwest along exposed surface gravel deposits about 100-300 yards wide (see Spread Creek Detail map).

Management History

The area is grazed by horses and cattle under a legislated grazing permit, but there has been no extraction activity. Two abandoned irrigation ditches cross the area.

Natural Environment

The project area, within the 100-year floodplain of Spread Creek, is an abandoned channel of Spread Creek. The active channel is at least 1,000 feet north and east of the project area toward the highway. Surface material consists of sand, gravel, and cobbles. Vegetation is sparse — isolated cottonwood trees and other localized areas containing forbs, grasses, and clumps of willow. Adjacent vegetation consists of cottonwood trees with sagebrush, grass, and forbs.

Poor vegetation and habitat conditions result in little wildlife use of the area. No fishery habitat exists at this site. Use of the area by elk, waterfowl, bald eagle, peregrine falcon, whooping

crane, and grizzly bear is the same as described for the Spread Creek bridge area (site 3.1 above).

Cultural Resources

There are no known archeological sites, but there have been no inventories meeting the secretary's standards. The project area has an extremely low potential for sites due to past flooding and sediment deposition. No historic structures are in the area.

Social and Economic Factors

The project area would mostly be screened by cottonwood trees from the East Side Highway. The area would be a 0.4-0.6 mile straight-line distance from the Moose Head Ranch.

3.3. UPPER SPREAD CREEK CHANNEL AREA

Location

This area in Grand Teton is within the stream channel of Spread Creek. The site begins 0.7 mile east of the highway bridge and ends 1.7 miles upstream at the park/national forest boundary. The forest access road parallels the site to the south (see Spread Creek Detail map).

Management History

No recent extractive use or other construction activity has occurred in this portion of the project area. A small irrigation diversion dam is upstream on national forest land, and an irrigation ditch crosses the area. The general area is under a cattle grazing permit, and an aerial powerline crosses the floodplain from north to south. A hydrological study of the stream (including this area) was made, analyzing the predicted effects of three scenarios of material extraction (Hydrau-Tech Inc. 1991). See "Environmental Consequences" section for results.

Natural Environment

The project area, a broad (300-600 foot-wide) channel with an unvegetated gravel/cobble substrate would follow the high-water channel lying between the active channel and the floodplain. This area, like Pilgrim Creek, originates on the steep highlands of the Bridger-Teton. A diversion dam is about 0.6 mile upstream of the park/national forest boundary. At this point the streambed gradient flattens, the water velocity decreases, and sediment deposition increases. Stream banks are often poorly defined, and the stream spreads into a broad channel with numerous gravel bars and multiple shifting channels. Natural base flows of approximately 50 cfs are drastically reduced by irrigation diversions. Adjacent vegetation is a mixture of cottonwood, sagebrush, grass, and forbs. Fish habitat in the project area is nonexistent to marginal. Use of the area by elk, moose, waterfowl, bald eagle, peregrine

falcon, whooping crane, and grizzly bear is the same as described for the Spread Creek bridge area (site 3.1).

Cultural Resources

Surveys meeting the secretary of the interior's standards have not been conducted in this area. The channel site has a extremely low potential for cultural sites due to past flooding and sediment deposition. No historic structures are in the area.

Social and Economic Factors

The project area would not be visible from the East Side Highway, but portions could be seen from the national forest access road. Fall elk hunting traffic passing the project area on the forest access road is moderately heavy. One commercial hunting camp and several informal campsites in the area.

3.4. SPREAD CREEK UPLAND AREA

Location

This project area is in Grand Teton, from 1.6 to 2.3 miles east of the East Side Highway, and immediately north of the gravel national forest access road (see Spread Creek Detail map).

Management History

The area is immediately adjacent to the park/national forest boundary. A small borrow pit of less than 0.1 acre was excavated several decades ago just outside the park boundary and has been colonized by grass and shrubs. The general area is under a cattle grazing permit, and an aerial power line crosses the area.

Natural Environment

This area is a flat alluvial terrace deposit, some 5-15 feet higher in elevation than the adjacent floodplain cottonwood forest to the north. No surface streams or ponds are on the site. Topsoil is thin sandy loam, with a substrate of gravel/cobble material. Vegetation is big sage, grass, and forbs. Uintah ground squirrel and other rodents, coyote, badger, hawks and other birds use the area. Elk migrate through during May and early June and from October through December. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, whooping crane, or grizzly bear.

The access road to the Bridger-Teton passes through a willow-grass wetland for 0.6 mile east of the East Side Highway. No ponds or standing water are adjacent to the road; however, willows indicate a high water table.

Cultural Resources

There are no known archeological sites, and surveys meeting the secretary of the interior's standards (see site 1. above) have not been conducted. The area has an unknown potential for cultural sites. No historic structures are in the area.

Social and Economic Factors

The entire project area would be visible from the gravel access road. Most traffic on this road is fall hunting traffic, with some summer and fall firewood cutting and hiking use. The area is not visible from the East Side Highway but would be visible from the commercial hunting camp.

4. RKO SITE

Location

This project area is west of the Snake River, 0.25 mile east of the Teton Park Road. Access is along a gravel road 0.2 mile east of the park road and 0.5 mile south of the Signal Mountain summit road intersection (see RKO Site map).

Management History

Two borrow pits were created during reconstruction of the park road in the early 1970s, with no site restoration. The disturbed area covers 30 acres. The site is within the natural environment subzone as identified in Grand Teton's *Statement for Management* (NPS 1985).

Natural Environment

No surface waters, floodplains, or wetlands are on or near the site. Soil within the disturbed area is sparse or absent due to past extractive use. Substrate is gravel/cobble glacial outwash, which is typical of the sagebrush flats of Grand Teton. Vegetation within the 30-acre disturbed area is sparse native and exotic forbs and grass, and scattered lodgepole pine, which are limited by lack of topsoil and compacted substrate. Surrounding vegetation on undisturbed land is a shrub-steppe plant community typical of Grand Teton with low and big sagebrush, forbs, and various grass species. Lodgepole pine/aspen forest grows a short distance to the north. Wildlife use of the disturbed area is impaired by poor vegetation and habitat conditions. Uintah ground squirrel and other rodents, coyote, badger, pronghorn, bison, elk, hawks, and other birds and mammals that dwell in open shrub habitat use the surrounding area. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, whooping crane, or grizzly bear.

Cultural Resources

There are no archeological sites in the area, but surveys meeting the secretary of the interior's standards (see site 1. above) have not been conducted. The potential for archeological is unknown. No historic structures are in the area.

Social and Economic Factors

The site is visible from the Signal Mountain summit overlook, 2.5 miles away. The pit floor is not visible from the park road; however, stockpiled material and dust plumes from processing equipment could be visible looking east from that road. The site is not visible from Signal Mountain Lodge and campground 1.5 miles north.

5. KELLY SITE

Location

This borrow site is 0.3 mile west of Kelly, 0.3 mile south of the Kelly/Gros Ventre road, and 0.2 mile from the Gros Ventre River on a gated gravel service road (see Alternative A map).

Management History

The site has been in long-term use as a material borrow source, and for stockpiling, processing material, maintenance equipment storage, landfill, and debris burning. It is currently used for material stockpiling and maintenance equipment storage. The site is within the natural environment subzone as identified in Grand Teton's *Statement for Management* (NPS 1985).

Natural Environment

No surface water resources or wetlands are on the site, which is above the Gros Ventre River floodplain. An irrigation ditch borders the site on the south and west. Soil has been removed or compacted on the 25-acre disturbed area. Substrate is compacted, coarse alluvial material. Vegetation in the disturbed area is sparse grass and forbs. Adjacent vegetation is upland shrub-steppe with big sagebrush, grass, and forbs. Cottonwood floodplain forest lies to the south. Wildlife use of the disturbed area is limited by poor vegetation and habitat conditions. The area is in a major elk migration route, and the surrounding area is used by Uintah ground squirrel and other rodents, coyote, badger, pronghorn, bison, migrating elk, hawks, and other birds that dwell in open shrub habitat. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, whooping crane, or grizzly bear.

Cultural Resources

No known archeological sites are in the area, but surveys meeting the secretary of the interior's standards (see site 1. above) have not been conducted. The potential for archeological sites is unknown. No historic structures are in the area.

Social and Economic Factors

The pit is not visible from houses in Kelly, and it is downwind (an important factor for dust). The site is visible from houses on the hillside 0.5 mile southeast of the site across the Gros Ventre River. The site is not visible from paved roads or other public facilities.

6.1. GROS VENTRE RIVER BLM LOT

Location

This 60-acre site, along the Gros Ventre River outside Grand Teton on the western park boundary, is public land managed by the Bureau of Land Management. It is approximately 0.4 mile upstream (east) of the Spring Gulch road bridge and 1.2 miles downstream of the East Side Highway bridge (see Gros Ventre River BLM Lot map).

Management History

The lot was a borrow source for embankment material during construction of river levees. No site restoration was performed on the 10-acre borrow pit area, and the pit was left with near vertical excavated walls, stockpiles of cobbles, and piles of logs. A river levee runs through the site on the south side of the river. Approximately 31 acres of the lot lie between the mid-channel line and the meander line near the levee, and 29 acres lie south of and above the meander line. Immediately north of the project area on non-NPS land, material was extracted from above the active stream channel for construction work on the Jackson Hole airport. Approximately 65,000 cubic yards of material were removed in 1986, and 80,000 cubic yards were removed in 1990. Material appears to have refilled the excavated area, and there is no evidence of past excavation.

Natural Environment

About half the lot is in the floodplain of the Gros Ventre River north of the river levee. The river and floodplain have similar characteristics to those described above for Spread Creek — high sediment loads, shifting multiple stream channels and gravel bars, and a relatively broad channel of gravel and cobble deposits. There are numerous upstream irrigation diversions, and the river dries up near the project site in late summer during dry years. Fish habitat conditions are poor due to unstable stream characteristics and periods of no water.

Topsoil on the upland portion of the lot south of the levee is thin to absent due to past extraction activities. Vegetation on the disturbed area south of the levee is sparse with forbs,

grasses, and isolated clumps of willow. Cottonwood and willow floodplain forest is adjacent to the disturbed area. The area north of the levee into the river is primarily nonvegetated, with some sparse willow growth.

Perching birds, rodents, and other small mammals use the area. Waterfowl use of this portion of the river is slight due to lack of suitable habitat. A pair of bald eagles nest along the Snake River 2 miles to the west. Low fish and waterfowl populations along this reach of the Gros Ventre River provide poor foraging habitat for bald eagles. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, or whooping crane. There is no history of grizzly bear use and no useful habitat due to proximity of settlements.

Cultural Resources

No archeological sites are in the area, but surveys meeting the secretary of the interior's standards (see site 1 above) have not been conducted. The potential for archeological sites is unknown. No historic structures are in the area. The site was heavily damaged by the 1927 Gros Ventre River flood.

Social and Economic Factors

The site is across the Gros Ventre River from private land and a golf course that is open to the public. Extraction and processing operations would be visible from the golf course. A year-round residential area has been developed in and around the golf course and the Spring Gulch road, with residences and other occupied buildings within 0.4 mile of the project area. Operations would probably not be visible but might be audible from residences. The county bridge is load-restricted.

6.2. GROS VENTRE RIVER BRIDGE AREA

Location

This area is on Grand Teton (downstream) and National Elk Refuge lands (upstream) at the East Side Highway bridge crossing the Gros Ventre River (see Gros Ventre River Bridge Area map).

Management History

Upstream (east) from the bridge the NPS boundary is the north bank, and the stream channel is on the National Elk Refuge. Activity upstream from the bridge would be under authorization of the National Elk Refuge and the U.S. Fish and Wildlife Service. The river downstream of the bridge is in Grand Teton. Bridge maintenance operations have periodically removed sediment over the past several decades. Approximately 40,000 cubic yards of gravel for road construction was removed from a 4.5-acre area upstream of the bridge in 1986. Sediment has refilled the extraction area, and there is no evidence of past excavation. A major irrigation headgate is on the south bank just downstream of the bridge. Cobble diversion structures are

annually built to direct flow into this headgate. The site within the park is in the natural environment subzone as identified in Grand Teton's *Statement for Management* (NPS 1985).

Natural Environment

The project area is in the active channel of the Gros Ventre River. This run of river has similar characteristics to those described above for the BLM lot and Spread Creek. Fish habitat is poor due to unstable stream characteristics. Substrate is alluvial gravel and cobble material.

Topsoil and vegetation are nonexistent. The site access road passes through cottonwood and willow floodplain forest.

The National Elk Refuge fence runs along the east edge of the highway right-of-way. Perching birds and hawks use nearby trees and the refuge fence, and rodents and other small mammals use nearby upland areas. There is little waterfowl use of this portion of the river due to lack of habitat.

A pair of bald eagles nest along the Snake River approximately 4 miles to the west. Low populations of fish and waterfowl along this reach of the Gros Ventre River provide poor foraging habitat for bald eagles. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, or whooping crane. There is no historic grizzly bear use and no useful habitat.

Cultural Resources

No known archeological sites are in the area, and no archeological surveys meeting the secretary of the interior's standards have been made. The area has a low potential for sites due to past sediment deposition and excavation. No historic structures are in the area.

Social and Economic Factors

This project area is visible from the East Side Highway and the Gros Ventre River bridge, but is not visible from private residences or other public facilities. There is little recreational use of this portion of the river. An irrigation diversion dam is immediately downstream from the bridge. Annual channel and diversion structure maintenance is done by private owners of the water rights.

7. EVANS CONSTRUCTION COMPANY

Location

This commercial material source is 16 miles south of the Grand Teton boundary, south of Jackson on U.S. 26/89/191 and west of the South Park Snake River bridge (see Alternative A map).

Management History

Material is excavated and processed in an existing permitted commercial operation. This is the only commercial aggregate material source in Teton County for supplying private and public sector construction projects.

Natural Environment

Description of natural environment conditions is not relevant; the site is a commercial venture operating under applicable county, state, and federal permits.

Cultural Resources

Description of cultural resources is not relevant; the site is a commercial venture operating under applicable county, state, and federal permits.

Social and Economic Factors

Description of social and economic factors is not relevant due to the site being an existing commercial venture operating under applicable county, state, and federal permits.

8. POTENTIAL UNSPECIFIED COMMERCIAL SOURCES

Development of new sources on private lands outside Grand Teton would be subject to applicable county, state, and federal permits. As these new sites become available the National Park Service would evaluate them for use subject to site selection considerations (discussed earlier in this plan) and NPS Special Directive 91-6 (see Appendix).

ALTERNATIVE B SITES

1.1. UPPER SPREAD CREEK CHANNEL USFS AREA

Location

This site would be on the Bridger-Teton, from the Grand Teton park boundary upstream approximately 0.6 mile to the irrigation diversion dam. This site would be immediately upstream (east) of alternative A site 3.3 (see Alternative B and Spread Creek Detail maps).

Management History

No significant extraction activities have occurred on this portion of Spread Creek. Irrigation water from Spread Creek is diverted at the dam. The creek immediately downstream of the dam has been channeled. The general area is under a cattle grazing permit.

A hydrological study was made of the stream (including this area), analyzing the predicted effects of three scenarios of material extraction (Hydrau-Tech Inc. 1991). See the "Environmental Consequences" section for results.

The Spread Creek drainage on the Bridger-Teton is management area 62 in the *Bridger-Teton National Forest Land and Resource Management Plan* (USFS 1989). The area north of Spread Creek to the east-west Grand Teton park boundary is managed for "desired future conditions" type 12; prescribed uses include "backcountry big game hunting, dispersed recreation, and wildlife security areas." Such areas are open to new mineral and energy leases, with stipulations to meet other resource objectives.

The area south of Spread Creek is managed for desired future conditions type 10; prescribed uses include "simultaneous development of resources, opportunities for human experiences, and support for big game and a wide variety of wildlife species" (USFS 1989). Such areas are open to some resource development having beneficial effects on wildlife.

Natural Environment

Natural environment conditions would be the same as described under alternative A site 3.3. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, whooping crane, or grizzly bear.

Cultural Resources

No known archeological sites are in the area; the Forest Service would be responsible for archeological inventories. The project area has low potential for archeological sites. No historic structures are in the area.

Social and Economic Factors

Portions of this run of the Spread Creek floodplain are visible from the gravel access road that parallels the creek. The area is not visible from paved roads, developed public facilities, or private land. Traffic on the Spread Creek access road is predominantly fall hunting traffic, with some summer and fall hiking and woodcutting traffic. There are several informal campsites and one commercial hunting camp in the area.

1.2. SPREAD CREEK USFS UPLAND

Location

This project area is on the Bridger-Teton, between the Grand Teton boundary and the access road. The project area is a continuation of the same landform as described under alternative A, site 3.4, as identified on the Spread Creek Detail map.

Management History

This area of the Bridger-Teton is managed for desired future conditions type 10, and prescribed uses include "simultaneous development of resources, opportunities for human experiences, and support for big game and a wide variety of wildlife species" (USFS 1989). Such areas are open to some resource development that is not adverse to wildlife.

Natural Environment

Conditions would be the same as described under alternative A, site 3.4. Other than transitory passage, there is no known or expected use by bald eagle, peregrine falcon, whooping crane, or grizzly bear.

Cultural Resources

No known archeological sites are in the area; the Forest Service would be responsible for archeological inventories. No historic structures are in the area.

Social and Economic Factors

The entire site would be visible from the nearby gravel access road. Most traffic on this road is fall hunting traffic, with some summer and fall firewood cutting and hiking use. The area is not visible from the East Side Highway or developed areas. There are several informal campsites and one commercial hunting camp in the area.

2. GROS VENTRE RIVER BLM LOT

This is the same site as described under alternative A, site 6.1 (see Gros Ventre River BLM Lot maps).

3. EVANS CONSTRUCTION COMPANY

This is the same site as described under alternative A, site 7 (see Alternative B map).

4. BOYLES HILL SITE (FORMERLY THE STATE SCHOOL SECTION SITE)

This site is about 3 miles west of Jackson and is accessible by county roads. It is a commercial site and environmental data on it are unavailable (see Alternative B map).

5. POTENTIAL UNSPECIFIED COMMERCIAL SOURCES

These sources are described under alternative A.

ALTERNATIVE C SITES, NO ACTION

Under this alternative, the FHWA *Materials Source Study* would be used to select likely sites for individual projects. Each project would be subject to full and complete environmental analysis and documentation. The site would be subject to a set of selection considerations and based on NPS needs at the time of project implementation.

ENVIRONMENTAL CONSEQUENCES

IMPACTS ON THE ENVIRONMENT

INTRODUCTION

This analysis describes the overall impacts occurring on a specific resource, such as air quality or vegetation, from the sum of activities at all of the sites. Given continuation of recent levels of federal road rehabilitation funding, one or two material sites could be active at once, and proposed activities and impacts would be spread over a wide geographic area and over 10-20 years.

Some of the sites and proposed actions of alternative B are the same as in alternative A, with the same effects. Differences from alternative A impacts will be described, including reduction of impacts or benefits of elimination of some sites and activities.

Because alternative C, no action, represents continued extraction of material (the same amount needed as in the other alternatives) but without a comprehensive long-term plan, it is not possible to specifically assess the impacts from such case-by-case actions in this plan/environmental assessment. The total impact from case-by-case extractions might likely be within the range of impact types and quantities described for alternatives A and B, but this remains to be determined.

This document will be submitted to the U.S. Fish and Wildlife Service for information and review. Specific road projects and borrow pit use that may affect a listed species would require consultation under section 7 of the Endangered Species Act.

IMPACTS COMMON TO ALL ALTERNATIVES

Impacts on Archeological Sites

Analysis. No known archeological sites would be affected on in-parks sites or on federal lands outside the parks. If, however, materials were encountered during contractor activity, activity would be stopped or redirected and material would be evaluated for significance. If found to be potentially significant, mitigation would be undertaken or salvage would be performed to recover material and data in compliance with section 106 of the National Historic Preservation Act.

There is moderate potential for archeological sites in the Spread Creek upland sites, and there are recorded sites near the Kelly site. There would be little potential for locating material in disturbed areas and the channel sites.

Conclusion. There would be no anticipated impact on archeological resources. If material were found during construction, appropriate mitigation measures would be taken and data would be recovered according to specified standards.

Impacts on Historic Sites and Structures

Analysis. There are no historic sites or structures near any of the sites that are potentially eligible, eligible, or on the National Register of Historic Places.

Conclusion. There would be no effect on any historic structures by proposed activities.

NATURAL RESOURCES

Impacts on Air Quality — Alternative A

Analysis. Air quality in the study area would potentially be affected by material production operations and road rehabilitation projects over the next 10-20 years. Impacts on air quality would be of two types: point-source dust and hydrocarbon emissions and mobile dust and hydrocarbon emissions dispersed along roads from truck traffic.

At the material source, heavy equipment would generate dust and hydrocarbon exhaust. Dust plumes, which may be visible for several miles, would be emitted from all sites during active operations. All contractor activity must comply with applicable state and federal air quality laws and permits.

Trucks hauling aggregate material or hot asphalt to road project sites would generate dust and exhaust emissions, with mobile emissions proportional to loads and mileage. Shorter haul distances from material sites in park areas near road rehabilitation jobs would reduce total truck mileage and traffic-generated dust and exhaust compared to longer hauls from outside of the parks. Significant fugitive dust escaping from loads of aggregate is unlikely due to the large particle size of aggregate material.

Conclusion. Dispersed and point-source dust and hydrocarbon emissions would not significantly impact local air quality. Contractors would be required to comply with all state and federal air quality regulations. Specific mitigation measures would be determined on a project-by-project basis.

Impacts on Air Quality — Alternative B

Analysis. Impacts on air quality from material extraction and processing would be of the same types described under alternative A; however, the sites would all be outside NPS areas at the Spread Creek channel and upland sites on the Bridger-Teton, the Gros Ventre River BLM site, and commercial sites. Effects would be localized and temporary during operation. Dust plumes would be emitted at the identified sites and other potential commercial sources. Dispersed dust and exhaust emission from truck traffic would be somewhat increased compared to alternative A due to greater haul distances.

Conclusion. Dispersed and point-source dust and hydrocarbon emissions would not significantly impact local air quality. Effects would be localized and temporary during operations. Compliance with air quality regulations and project-specific mitigation would be the same as alternative A.

Impacts on Air Quality - Alternative C (No Action)

Analysis. The impacts of this alternative would be generally the same as those described in alternatives A and B.

Conclusion. Dispersed and point-source dust and hydrocarbon emissions would not significantly impair local air quality. Compliance with air quality regulations and project-specific mitigation would be the same as alternative A.

Impacts on Water Quality — Alternative A

Analysis. The upland material and processing sites are generally well removed from streams, with little chance of runoff entering streams. Local soils are very porous and readily absorb precipitation. On-site fuel and oil storage and handling would be in accord with state and federal regulations. Contamination of subsurface aquifers due to fuel and oil spillage would be unlikely.

Material sites in channels near surface water would include the Snake River, Pilgrim Creek channel, Spread Creek bridge, upper Spread Creek channel, Gros Ventre River BLM lot, and the Gros Ventre River bridge sites. The impacts of increased turbidity would be prevented by prohibiting excavation in flowing water. Excavation would be permitted only during low water periods when the high-water channels are dry. The streams just listed either dry up or have low discharge in late summer and fall in the proposed project areas, leaving relatively broad expanses of exposed gravel bars and dry streambeds.

Temporary diversion of an active channel might sometimes be necessary to prevent excavation activity from creating water quality degradation in flowing water. No fill material would be placed in the channel sites except in conjunction with temporary diversion structures and minor stream crossings (see previous stream channel cross section).

Conclusion. Implementing all appropriate protective measures would eliminate significant impacts to water quality. These protective measures and mitigations would be fully addressed in the project-specific environmental compliance documentation and would be included in the construction contract specifications. Compliance with the requirements of the Clean Water Act of 1977, as amended, would be obtained for individual projects where required.

Impacts on Water Quality — Alternative B

Analysis. Extraction from the federal lands on the Spread Creek and the Gros Ventre River sites would have the same potential to increase sedimentation and turbidity and would be subject to the same restrictions described in alternative A. Mitigation by low-water seasonal scheduling and avoiding wet channels would prevent significant effects on water quality. Excavation from commercial sources would be subject to the mitigation and permit requirements under which the pit is operated.

Conclusion. There would be no expected significant effect on the water quality of Spread Creek or the Gros Ventre River. Impacts at commercial sites would depend on the requirements of the commercial permit.

Impacts on Water Quality — Alternative C (No Action)

Analysis. The impacts of this alternative would generally be the same as those described in alternatives A and B.

Conclusion. Specific extraction sites would be chosen on a project-by-project basis. Implementing all appropriate protective measures would preclude significant impacts to water quality. These protection and mitigation measures would be fully addressed in the project-specific environmental compliance documentation and would be included in the construction contract specifications. Compliance with the requirements of the Clean Water Act of 1977, as, amended would be obtained for individual projects where required.

Impacts on Floodplains/Stream Hydrology — Alternative A

Analysis. Proposed material extraction would affect the floodplains of the upper Snake River below Flagg Ranch, and the channels of Pilgrim Creek, Spread Creek at the bridge and/or upstream, and the Gros Ventre River at the BLM site and/or highway bridge sites.

The Federal Highway Administration contracted for a hydrological study of Spread Creek for this environmental assessment (Hydrau-Tech Inc. 1991). The area studied was Spread Creek from its confluence with the Snake River upstream 4.3 miles to the Grand Teton boundary, plus 0.7 mile to an irrigation dam on the Bridger-Teton. A simulation model computer program called BRI-STARS was used. (BRI-STARS stands for **BRI**dge **S**tream **T**ube computer model for **A**lluvial **R**iver **S**imulation, and was developed for the Federal Highway Administration between 1987 and 1990.) Data on stream flow, topography, channel cross sections, geomorphology, sediment size distribution, watershed hydrology, and stream hydraulics were entered into the model. Three material removal schemes were analyzed for effects on stream channel stability and potential for material to refill the excavations.

All three material removal schemes (see Spread Creek Detail map) provided 150,000 cubic yards of material over a period of five years in two stages. Each stage would remove approximately 75,000 cubic yards of material.

Scheme 1, at alternative B site 1.1, was a rectangular excavation 4 feet deep, 400 feet wide, and 2,500 feet long in the center of the Spread Creek alluvial plain, upstream of the Grand Teton/Bridger-Teton boundary.

Scheme 2, at alternative A site 3.3, was a rectangular excavation 6 feet deep, 275 feet wide, and 2,500 feet long along the watercourse in the center of the Spread Creek alluvial plain within Grand Teton, immediately below the park boundary. The excavation gradient would parallel the existing channel gradient.

Scheme 3, at alternative A site 3.1, was a series of rectangular excavations extending along the active channel of Spread Creek from about 1,500 feet upstream of the highway bridge to a point about 3,000 feet downstream of the bridge. Above the bridge, the excavation was 5 feet deep, 250 feet wide, and 1,500 feet long; the downstream excavation was 5 feet deep, 250 feet wide, and 3,000 feet long.

The computer model evaluated the effect on stream dynamics of lowering the streambed as described in the excavation schemes. As with all floodplains and streams, the dynamics of sediment transport and channel stability are complex. The model output data suggests the streambed above the bridge in the area of scheme 1 is eroding down (degrading) between large floods and redepositing material just above and below the bridge where the gradient flattens in the area of scheme 3. The streambed below the bridge is building up (aggrading). Large floods transport most of the material. Material will continue to build up upstream and downstream of the highway bridge in the area of scheme 3, requiring continued long-term maintenance of the bridge opening by removing sediment to allow passage of flood waters.

All three extraction schemes were deemed acceptable from a hydraulic point of view and would not cause significant impacts on the channel system stability (Hydrau-Tech 1991). Big floods transport and deposit greater quantities of material, and the rate of material redeposited in excavations would depend on the number of years until the next flood. Material would refill in all three excavation schemes; however, the rate of refill would be related to stream gradient and location along the stream. Scheme 3 (above and below the highway bridge) would be the most likely to refill with equivalent material, then scheme 1 (upstream of park boundary on Bridger-Teton land), and then scheme 2 (downstream of the park boundary on Grand Teton land).

Other floodplain values, such as the dissipation of flood waters, would not be adversely affected in any of the three schemes. No downstream structures or residential areas would be placed at risk. Extraction operations within floodplains would require concurrence by the Fish and Wildlife Service, in accordance with the Fish and Wildlife Coordination Act, and might require Army Corps of Engineers section 404 (Clean Water Act) permits.

The Snake River site is within the 100-year floodplain but above the ordinary high-water line, and only infrequent major flooding would affect the site. No impacts on the floodplain would be expected from proposed excavation and reclamation activities. Army Corps of Engineers 404 permits would be required if the pit is expanded into undisturbed wetland areas. A Wyoming Department of Environmental Quality permit would be necessary if dewatering of excavation areas is required.

Material has been removed from below the ordinary high-water line of the floodplain of the Gros Ventre River bridge area (40,000 cubic yards) and opposite the BLM lot (145,000 cubic yards over five years) with no apparent impact on the floodplain or destabilization of the stream channel. There was no visible evidence of extraction activities one-two years later, and stream channels were not disturbed.

Conclusion. There would be no anticipated impact on floodplains of the upper Snake River, Pilgrim Creek, or Gros Ventre River from proposed activities. Excavation would be feasible in several sites of the Spread Creek floodplain without adverse impacts on stream channel

stability. Activities on Spread Creek would be evaluated before similar hydrological studies were made on other floodplains.

Impacts on Floodplains/Stream Hydrology — Alternative B

Analysis. Effects of excavation from the Spread Creek USFS channel site would be essentially the same as described under alternative A. This channel site corresponds to the scheme 1 area evaluated in the hydrological study summarized above under alternative A. The study indicated that material could be removed without causing channel destabilization.

The Gros Ventre River BLM site could be used as a material source with the same actions and effects described under alternative A.

No other channel sites have been identified to date; however, given the abundance of material in the stream channels in the Jackson Hole area, sites might be developed as commercial sources outside parklands.

Conclusion. There would be no adverse effects on channels on parklands. Extraction from the Spread Creek USFS and Gros Ventre River BLM channel sites would not cause significant impacts on stream hydrology or stability or other floodplain values. No downstream values or features would be affected.

Impacts on Wetlands — Alternative A

Analysis. Excavation from upland sites would have no effect on wetlands. Except at the Snake River site, excavation from channel sites would not adversely affect wetlands due to the nonvegetated nature of the channel areas. The Snake River site, most of which is in a wetland area, has been developed over the last 30-years. Over 65 acres of former wetlands have been converted to pond habitat and dry, compacted, unvegetated areas. Although planned (FHWA 1992), site reclamation activities have not yet been implemented and natural revegetation has not been established. Most of the existing pond habitat is too deep to support emergent vegetation.

No encroachment on wetlands would occur at Pilgrim Creek due to excavation, hauling, or processing.

Any significant traffic by large trucks on the Spread Creek road to the upper channel or upland sites would require widening the gravel road east of the East Side Highway through 0.6 mile of willow/grass scrub/shrub wetland (no ponds or standing water), with fill placed on up to 1.0 acre. Compliance with the Clean Water Act would be required.

Conclusion. Pending site selection, proposed activities over the next 10-20 years may result in fill on 1.0 acre of willow/grass wetland along the Spread Creek gravel road. The planned reclamation of the Snake River site would result in the creation of 46 acres of ponds. Complete restoration of this site to preexisting wetland conditions would require substantial additional investment.

Impacts on Wetlands — Alternative B

Analysis. There would be no effect on wetlands at the Spread Creek USFS channel and USFS upland sites. Widening the national forest access road east of the East Side Highway to accommodate construction truck traffic would be the same as under alternative A, destroying 1.0 acre of willow/grassland along the road by fill placement.

Activities and effects at the Gros Ventre River BLM site would be the same as described under alternative A, with no significant effects.

Conclusion. There would be no effect on wetlands at the Spread Creek USFS channel or upland sites or at the Gros Ventre River BLM site. Approximately 1.0 acre of willow/grass wetland would be destroyed by fill placement along the access road at the Spread Creek sites.

Impacts on Wetlands — Alternative C (No Action)

Analysis. Impacts would generally be the same as for alternatives A and B.

Conclusion. Development of sites other than those described is highly unlikely. Project-specific selection considerations would take into account the presence of wetlands and use of a specific area and fully comply with the Clean Water Act, the National Environmental Policy Act, and other applicable laws.

Impacts on Soils — Alternative A

Analysis. The channel sites typically have no soil, and there would be no effect from excavation on soils at those sites. Topsoils removed from upland sites would be salvaged for reclamation.

Further excavation at the Snake River site would remove 10 acres of undisturbed wetland soil, with site reclamation after final use. Prior to disturbance, soil would be stripped and stockpiled for use during later reclamation.

Excavation at the Spread Creek upland site, or use of the site as a processing/stockpiling site, would result in loss of surface soil. During site development, topsoil would be salvaged and stockpiled for later reclamation use. Approximately 40 acres of topsoil could be affected with full development.

Excavations from the RKO, Kelly, and upland portions of the BLM lot would remain in the disturbed areas. Access road upgrading would result in less than 5 acres of new disturbance to soils.

Construction of a new haul road from the Moose Head Ranch road to the Spread Creek dry channel site would impact 2-3 acres of undisturbed soil because of grading and stripping surface soil and placement of road base fill. All stripped topsoil would be stockpiled for later reclamation of the disturbed areas.

A new haul road from the Pilgrim Creek channel site to the processing site would result in approximately 5 acres of soil disturbance. These soils would be salvaged, stockpiled, and used in later reclamation. There would be no effect on soils at the Colter Bay maintenance site if Pilgrim Creek material were processed there because activities would be limited to the existing disturbed area.

Conclusion. Soils would be disturbed at all sites. The actual amount of disturbance would depend on final site selection and design. Impacts would be reduced as much as possible through the full and proper use of the site selection considerations.

Impacts on Soils — Alternative B

Analysis. Extraction from the Spread Creek USFS channel site would have no effect on soil due to the lack of soil along the stream and in the project area. Construction of a haul road to reach the channel might result in less than 1.0 acre of soil disturbance by grading and placement of road base material.

Extraction from the Spread Creek USFS upland site would have effects similar to those described under alternative A, but the size of excavation and area of soil disturbance could be greater, with up to 80 acres of potential disturbance. Surface soil would be salvaged and stockpiled for later reclamation use.

Activity and effects at the Gros Ventre River BLM site would be the same as described under alternative A, with potential disturbance of 3.0 acres of soil from haul road construction. About 30 acres of disturbed upland area would be restored.

Conclusion. There would be no effect on soils within NPS areas by actions in this alternative. There would be potential for new disturbance of soils at the off-park sites at Spread Creek, the Gros Ventre River, and the Evans site. Some soils in Grand Teton could be disturbed along the national forest access road site to the Spread Creek area.

Impacts on Soils — Alternative C (No Action)

Analysis. Impacts would likely be the same as described for alternatives A and B.

Conclusion. Development of sites other than those described in alternatives A and B is highly unlikely. Project-specific selection considerations would minimize soil disturbance as much as possible.

Impacts on Terrain Features — Alternative A

Analysis. Alteration of existing terrain features would depend on final site selection, type of site, and how much material was extracted from a given site. In general, when material is extracted from upland sites, a permanent depression is left in the ground. Appropriate excavation design might mitigate previous straight-edged pits or other obvious constructed disturbances. If all proposed excavations were from upland sites, approximately 3 million cubic

yards of material would be removed, with a corresponding volume of pits created. A cube containing 3 million cubic yards is 432 feet in each dimension. Excavations from channels would refill with stream-transported sediment.

Pilgrim Creek road site would be partially refilled with reject material to resemble a more natural landform. The reclamation plan for the Snake River site would resemble floodplain ponds. The RKO and Kelly sites and the upland portion of the BLM lot have excavations that are obviously man-made. Further excavation at these sites would be designed to remove old stockpiles and sculpt excavations to approximate natural landforms.

Excavation from the Spread Creek upland site would modify a natural alluvial terrace deposit landform. No operation plan or design exists at this date.

Conclusion. Impacts on terrain features depend on what types of sites are selected and how much material is extracted from sites. Initial site design would integrate site reclamation planning to result in natural-appearing terrain features. Impacts on floodplain topography from excavation along streams would be short term and restored by the next flood.

Impacts on Terrain Features — Alternative B

Analysis. There would be new and permanent modification of the Spread Creek USFS upland site. Proposed action would be similar to that described under alternative A; however, the quantity of material removed could be much more. If this site were selected as the only source to supply NPS road projects in northern Grand Teton, the Parkway, and southern Yellowstone, approximately 2 million cubic yards of material might be removed for processing and use. A portion of this would be rejected material, which would be returned to the source. As described under alternative A, material removed from an upland site inevitably leaves a permanent depression, but the appearance of this site would be mitigated by designing the excavation to resemble nearby landforms.

Based on the hydrological study, the Spread Creek USFS channel site could supply a portion of the 2 million cubic yards of material with no permanent change in channel morphology.

Conclusion. Selection of this alternative would have essentially the same impact as alternative A. If the Spread Creek USFS upland site were selected as the only source to supply all of the northern Grand Teton and southern Yellowstone park roads, a far larger excavation would occur. This pit would be immediately adjacent to the park boundary. Mitigation would include excavation designed to resemble nearby landforms. Excavation from the Spread Creek USFS channel site would not create significant terrain modifications.

Impacts on Terrain Features — Alternative C (No Action)

Analysis. Impacts would likely be the same as described for alternatives A and B.

Conclusion. Development of sites other than those described is highly unlikely. Project-specific selection considerations would minimize terrain disturbances.

Impacts on Vegetation — Alternative A

Analysis. At most existing upland sites that would be selected, excavation would occur within the zone of previous disturbance, and little if any new disturbance to vegetation would occur. Native vegetation would be reseeded on appropriately treated surfaces after prescribed use. Excavation at the Snake River site could disturb 10 additional acres of wetland vegetation. Upland areas that have been disturbed by past use with little vegetation regrowth are the upland portion of the Snake River, RKO, Kelly, and BLM sites, with a total 100 acres of bare ground. Approximately 80 acres of this would be reclaimed after prescribed extraction. Colonization of disturbed sites by exotic weeds is an increasing problem, and reclamation plans would include prescriptions for follow-up weed treatments. The remaining 20 acres (the Kelly site) would be used for long-term maintenance storage areas.

Impacts on vegetation at the Spread Creek upland would all occur on an undisturbed plant community of sagebrush, grass, and forbs. The site is treeless. Up to 40 acres of undisturbed vegetation could potentially be stripped and removed, with eventual reclamation. Construction of a haul road from the Moose Head Ranch road would require removal of 2-3 acres of cottonwood/grass/forb vegetation that would be reclaimed after use.

Construction of the haul roads to the Gros Ventre River BLM lot and at the Pilgrim Creek site might require clearing less than 10 acres of vegetation. Reclamation of the Gros Ventre River BLM lot would restore cottonwood/willow floodplain forest on 29 acres of abandoned borrow pits south of the river levee.

Impacts on vegetation at channel sites would be minimal and consist of clearing isolated cottonwood trees growing in gravel deposits.

Conclusion. Of the 100 acres of already disturbed areas, 80 acres of this would be revegetated after extraction activities are completed. Of the approximate 60 acres of proposed vegetation removal at the Snake River, Spread Creek, Gros Ventre, and Pilgrim Creek sites (plus access roads), all acreages would be revegetated once extraction activities were completed.

Impacts on Vegetation — Alternative B

Analysis. There is no vegetation at the Spread Creek USFS channel site. Construction of a road to the site would disturb less than 1.0 acre of vegetation.

If the Spread Creek USFS upland site was used as a processing and stockpiling site for material from the channel site, impacts would be the same as described under alternative A — the removal of up to 40 acres of vegetation. If the upland site was selected as a source, extraction would impact the same 40 acres.

Activity at the Gros Ventre River BLM site would have the same effect as described under alternative A, with potential disturbance of 3.0 acres from haul road construction and reclamation of all or a portion of the 30-acre disturbed upland area.

The National Park Service would seek funding to reclaim 65 acres at the Snake River site and all other previously disturbed sites.

Conclusion. Proposed activities would impact up to 40 acres of sagebrush vegetation on the Bridger-Teton at Spread Creek and destroy 3 acres of cottonwood/grass vegetation in Grand Teton near the Gros Ventre River. Later reclamation of 20-30 acres of past disturbance on the Gros Ventre River BLM site would also be done.

Impacts on Vegetation - Alternative C (No Action)

Analysis. Impacts would likely be the same as described for alternatives A and B.

Conclusion. Development of sites other than those described is highly unlikely. Project-specific selection considerations would minimize impacts to vegetation.

Impacts on Fish — Alternative A

Analysis. Proposed activities at upland sites would have no effect on fish habitat. Proposed activities at the Spread Creek bridge and channel sites and the Gros Ventre River BLM and bridge sites would not affect fish or invertebrate habitat. These streams are frequently dewatered in late summer in the project areas.

Conclusion. Proposed activities would be designed to avoid effects on fish habitat both near the project sites and downstream. Activities at the upland sites would have no effect on fish.

Impacts on Fish — Alternative B

Analysis. Excavation at the Spread Creek USFS channel site and the Gros Ventre River BLM site would likely have the same lack of effect on the fish habitat as described under alternative A. Excavation at the Spread Creek USFS upland would have no effect on fish habitat.

Conclusion. Proposed excavation at the Spread Creek and the Gros Ventre River sites would have no significant effect on fish or fishery habitat near the project sites or downstream.

Impacts on Fish — Alternative C

Analysis. Impacts would likely be the same as described for alternatives A and B.

Conclusion. Development of sites other than those described is highly unlikely. Project specific selection considerations would minimize or avoid impacts on fish habitat.

Impacts on Wildlife — Alternative A

Analysis. Larger mammals such as elk, antelope, bison, and coyote that use habitat adjacent to extraction sites would be temporarily displaced by activity during operation periods. Small mammal habitat at all upland sites and haul roads would be destroyed.

Channel sites proposed for extraction are essentially barren of vegetation, providing little habitat for birds or mammals.

With the exception of the Snake River and Spread Creek upland sites, there would be little or no new habitat destruction because extraction activity would largely be confined to previously disturbed ground. However, proposed activity at the Snake River site would destroy an additional 10 acres of wetland habitat adjacent to the existing material source. Elk, bear, and moose use this general area.

Proposed activities at the Spread Creek upland site would destroy up to 40 acres of sagebrush/grass/forb habitat. Animals would be temporarily displaced from an undetermined additional acreage during periods of equipment operation and traffic. Elk migrating through the Spread Creek area during the spring and fall would not be affected because extraction activities would be prohibited or modified during these periods. Site would be reclaimed after use.

Conclusion. The loss of 40 acres at the Spread Creek site would not have a significant impact on overall sagebrush habitat availability. The loss of 10 additional acres of wetland habitat at the Snake River site could be significant in that current NPS policies dictate preservation and enhancement with no net loss.

Impacts on Wildlife — Alternative B

Analysis. Loss of habitat at the Spread Creek USFS upland site would be identical to alternative A. There would be similar impacts on the BLM site.

Conclusion. The overall loss habitat and displacement of animals would not be considered significant.

Impacts on Wildlife — Alternative C

Analysis. Impacts would likely be the same as described for alternatives A and B.

Conclusion. Development of sites other than those described is highly unlikely. Project specific selection considerations would minimize or avoid impacts on wildlife habitat.

Impacts on Endangered Species — Alternative A

Analysis. The Snake River site would be within the grizzly bear recovery zone, peregrine and bald eagle foraging areas, and potential whooping crane habitat. Activities at the site would

have no measurable affect on the peregrine falcon or bald eagle. Effects on the whooping crane are unknown. Although there have been no conflicts involving grizzly bears, there would be a potential for human/bear conflicts.

Proposed activities at the Spread Creek, RKO, Kelly, and Gros Ventre River sites would have no effect on endangered species because there is no known or suspected use of these sites.

Activities at Pilgrim Creek would have no effect on bald eagle, whooping crane, or peregrine falcon because of poor riparian habitat conditions. The upper Pilgrim Creek channel site is within the grizzly bear recovery zone. Grizzly use of the area has been frequent, and the area is used as a travel corridor. Bear/human contact could increase due to additional use of the area and/or grizzlies might use a different travel route. Bear/human contact might also increase due to increased extraction activities. No foraging habitat would be directly impacted by activity in this area.

Conclusion. Proposed activities at the Snake River and Pilgrim Creek sites might affect endangered species and consultation would be required. There would be no effect from activities at the Spread Creek, RKO, Kelly, and Gros Ventre River sites.

Impacts on Endangered Species — Alternative B

Analysis/Conclusion. There would be no affect on endangered species at any of the sites in this alternative.

Impacts on Endangered Species — Alternative C

Analysis. Impacts would likely be the same as described for alternatives A and B because no other sites would likely be considered.

Conclusion. Project-specific endangered species consultation would be required to minimize or avoid affects on listed species.

SOCIAL ISSUES

Impacts on Visual Quality — Alternative A

Analysis. Contractor equipment, material stockpiles, and dust plumes would be visible from paved park roads near the Snake River, Pilgrim Creek channel and road, Spread Creek bridge, and Gros Ventre River bridge sites. The Spread Creek upland site would be visible from the forest access road.

Excavation and/or processing could be visible at the Spread Creek abandoned dry channel, RKO, Kelly, Blacktail, and Gros Ventre River BLM sites to visitors on paved park roads.

Excavation and/or processing would be visible from residences near the Kelly, Evans, and possibly the Gros Ventre River BLM sites.

Contractor equipment and/or material stockpiles would not be visible from paved roads, developments, or residences at the upper Spread Creek channel and Spread Creek upland sites. None of the proposed sites would be visible from park lodging concessions.

Conclusion. Many excavation or processing sites would be visible from residences or to people traveling paved roads. Visibility of these sites is assumed to be an adverse impact on the natural landscape as viewed by park visitors and therefore would be counter to NPS *Management Policies* (9:4). Visual impacts from excavation and processing, including dust plumes, would be temporary. Material may be stockpiled and visible from public places, causing visual impacts of longer duration.

Visibility of material excavation and processing could be reduced by restricting operations to periods of low visitation; however, these restrictions might conflict with other proposed closures. Visitors' negative impressions might be mitigated by telling the public why these activities are occurring.

Impacts on Visual Quality — Alternative B

Analysis. Excavation and processing at the Spread Creek USFS sites would not be visible from paved park roads or developed facilities; however, the dust plumes created by these activities would be visible from great distances. Excavation, stockpiles, dust plumes, and contractor activity would be visible from 0.1 mile on the Spread Creek forest access road.

Effects at the Gros Ventre River BLM and Evans sites would be the same as described under alternative A.

Conclusion. Significance of the visual impacts would be similar to alternative A. Excavation, stockpiles, dust plumes, and contractor activity would be visible from the Spread Creek forest access road but not from paved park roads or facilities.

Impacts on Visual Quality — Alternative C

Analysis/Conclusion. Sites other than those described in alternatives A and B would not likely be chosen as material sources. The impacts on visual quality would be similar to those described in alternatives A and/or B.

Impacts on Visitor Use — Alternative A

Analysis. Visual quality and aesthetics affect visitor use and enjoyment; however, analysis of such a subjective topic is difficult. Little if any physical inconvenience to park visitors such as delays, noise, major visual impacts at popular destinations or developed areas, widespread dust, or significant restriction on travel would be anticipated from proposed excavation and processing. Road reconstruction work would inevitably cause traffic delays and inconvenience; however, this is beyond the scope of this study and would be addressed by appropriate compliance documents on a project-specific basis.

Excavation and processing sites would be away from areas commonly used by visitors and would be closed to park visitors, by gates and signs, for safety and security reasons. Closure would last continue through the particular site's use.

Conclusion. Restriction, inconvenience, or other effects on park visitors by proposed activities are difficult to determine in a general analysis. These impacts would be discussed in detail in project-specific environmental compliance documents. Visitors would benefit from continued road rehabilitation and maintenance.

Impacts on Visitor Use — Alternative B

Analysis. With no borrow sources in park areas, there would be no direct impact on visitors from diminished visual quality or accessibility as discussed under alternative A.

Conclusion. There would be no direct impacts on park visitors from borrow sources proposed in this alternative. Visitors would benefit from continued road rehabilitation and maintenance.

Impacts on Visitor Use — Alternative C

Analysis/Conclusion. Sites other than those described in alternatives A and B would not likely be chosen as material sources. The impacts on visitor use would be similar to those described in alternatives A and B with little effect on the visitors.

Impacts on Traffic — Alternative A

Analysis. Traffic delays connected with road construction or rehabilitation projects could be anticipated from material hauling traffic. Traffic concerns would be safety, inconvenience from noise and dust generated by big trucks, and adding to existing traffic congestion. Sites and stockpiles closer to road rehabilitation projects would result in less truck traffic on haul routes than from sites and stockpiles that are outside the parks.

Large hauling trucks of 40,000 to 80,000 pounds gross vehicle weight carry from 10 to 20 cubic yards of material per load. To transport 100,000 cubic yards of material for a 1-2 year construction job would require from 5,000 to 10,000 truck trips from the source to a park staging site. To transport the 3 million cubic yards of raw material for the NPS 20-year needs for road rehabilitation would require from 150,000 to 300,000 truck trips. The trip length, origin, destination, and timing would depend on the material sites selected.

Trucks hauling from commercial sources south or west of Jackson would have to travel Jackson city streets or the Spring Gulch road. Both roads pass residential areas. Jackson streets, including the truck bypass, are congested with cars and pedestrians. Safety conflicts could be a problem because heavily loaded trucks cannot stop quickly. Big trucks would increase noise and dust levels in the vicinity, with inconveniences to people along the haul route in Jackson. Noise and dust could also cause inconvenience to residents along the Spring Gulch road.

Conclusion. There may be some inconvenience from traffic of large hauling trucks on haul routes mixing with visitor traffic. Dust and noise generated by big hauling trucks would inconvenience travelers and residents of Jackson and the Spring Gulch road, but the degree and overall duration of inconvenience would depend on which sources are selected and how much material is hauled. Truck traffic mileage and inconvenience resulting from this alternative would be less than alternative B and similar to alternative C.

Impacts on Traffic — Alternative B

Analysis. Hauling mileage would be increased due to the wider distribution of borrow sites in this alternative. Truck traffic would be increased on NPS roads, state highways in Jackson Hole, and probably through Jackson or on the Spring Gulch road. The inconvenience to park visitors, residents and visitors to Jackson, and residents along the Spring Gulch road would be the same as described under alternative A; however, the degree of inconvenience from this alternative would most likely be greater than for alternative A.

Conclusion. Truck traffic and the resulting inconvenience would be greater for this alternative than for alternative A. There would be some indirect and unquantifiable impact on park visitors from increased traffic of hauling trucks from the outlying sources compared to alternative A. People traveling south of Grand Teton, residents and visitors of Jackson, and/or residents and golfers along the Spring Gulch road would also be affected.

Impacts on Traffic — Alternative C

Analysis/Conclusion. Sites other than those described in alternatives A and B would not likely be chosen as material sources. The impacts on traffic would be similar to those described in alternatives A and B. Impacts would vary depending on the material source selected and would be detailed in project-specific compliance documents.

Impacts on Roads — Alternative A

Analysis. In general, highways are designed for certain ranges of vehicle axle weights. Heavier truck traffic can damage the asphalt and base structure of a road. State highways are designed for heavy commercial truck traffic. Newer NPS roads are also designed for the heavy axle weight of recreational vehicles and tour buses. Older park roads and the Spring Gulch Road were not designed for heavier vehicle traffic. Damage to roads from heavy loads is difficult to quantify. Trucks hauling material would be within legal load limits; however, the amount of hauling required under this alternative could potentially damage roads, reduce service life, or at least increase maintenance requirements and costs. The choice of material sources near project application areas is advantageous to reduce road and pavement damage.

Otherwise, proposed paving overlays under this alternative would maintain good road conditions and reduce long-term maintenance costs.

Conclusion. Damage to existing asphalt pavement or base structure might occur from material hauling traffic, with haul mileage and potential damage of this alternative less than alternative B and similar to alternative C.

Impacts on Roads — Alternative B

Analysis. Hauling truck traffic would occur over state highways, NPS roads, and possibly Teton County roads, with potential for damage to asphalt and road base as described under alternative A. Traffic on all roads, especially on park roads of northern Grand Teton, would increase under this alternative, as would road damage and maintenance costs, because of greater distances to the material sources. There would be a corresponding increase in road damage and maintenance costs.

Conclusion. The potential for road damage from heavy truck traffic under alternative B would be greater than under the other alternatives. Damage could occur to NPS, state, and county roads.

Impacts on Roads — Alternative C

Analysis/Conclusion. Sites other than those described in alternatives A and B would not likely be chosen as material sources. The potential for damage to the roads is similar to that described in alternatives A and B. Impacts would vary depending on the material source selected and would be detailed in project- specific compliance documents.

Impacts on Public/Private Material Supply — Alternative A

Analysis. Commercial sources are among suggested sources to supply southern Grand Teton areas in this alternative. The estimated reserves of the only operating commercial source are 500,000 cubic yards, which NPS needs alone could exhaust. Exhausting the supply and driving up prices would have a significant impact on the local economy and create a hardship on the community. Development of additional commercial sources would impact the local environment and community. Such development would be contingent on an analysis under county and state regulations.

Conclusion. The choice of commercial versus public land material sources could significantly influence supply and demand factors of the local material commodity market. Dependence on commercial sources could disrupt local market conditions or more likely could provide the incentive for additional commercial development.

Impacts on Public/Private Material Supply — Alternative B

Analysis. Excavation of material from the Spread Creek USFS channel and upland sites would effect the local material supplies. If opened by the U.S. Forest Service, these sites would be available to public and private use other than NPS projects, and access would be

required across parkland; the National Park Service would have no control over these operations.

Although material for southern Grand Teton roads might be excavated from the Gros Ventre River BLM site, significant quantities could be purchased from commercial sources. This alternative would have greater influence on the supply and demand factors of the local material market than the other alternatives. The final effect on the local material market would be difficult to predict.

Conclusion. Alternative B would have the greatest potential for influencing supply and demand factors of the local material commodity market.

Impacts on Public/Private Material Supply — Alternative C

Analysis/Conclusion. The effects of this alternative would be similar to alternative A but possibly less than alternative B.

Impacts on Other Public Agencies — Alternative A

Analysis. This alternative considers excavation of material from non-NPS public lands on two sites outside of Grand Teton. The Gros Ventre River site is on land managed by the Bureau of Land Management, and proposed activity would be under a memorandum of agreement. The 60-acre lot is separate from other BLM land, and management could be transferred to the National Park Service, either before or after extraction and restoration. No unusual administrative costs to the Bureau of Land Management would be expected.

Extraction at the Gros Ventre River bridge site upstream (east) of the highway right-of-way would lap over onto the National Elk Refuge (managed by the U.S. Fish and Wildlife Service). Proposed activity would be under a memorandum of agreement with the Fish and Wildlife Service, and no significant administrative costs would be incurred by them

Conclusion. No significant costs or other impacts would affect federal, state, or county agencies.

Impacts on Other Public Agencies — Alternative B

Analysis. Before a USFS permit would be issued for borrow excavation or surface occupancy for processing and staging, further environmental compliance would be required, including a cumulative effects analysis regarding other forest values. Use of the USFS sites would require a change in the management unit prescription, which requires extensive public participation.

Impacts on the Bureau of Land Management would be the same as described under alternative A.

Conclusion. Bridger-Teton staff time and expense would be required for further impact analysis and permit issuance for material production at either Spread Creek USFS site. No

significant costs or other impacts would be anticipated on other county, state, or federal agencies.

Impacts on Other Public Agencies — Alternative C

Analysis/Conclusion. Depending on the sites chosen, impacts would be similar to those described in alternatives A and B.

Impacts on Park Road Rehabilitation Costs — Alternative A

Analysis. The cost of excavation, processing, and hauling material to the application sites on federal road rehabilitation projects averages one-third of total project costs when materials are from public land sources close to the project (personal communication, Dan O'Brien, Federal Highway Administration). Haul cost is probably the most significant variable of material source selection. The Federal Highway Administration has estimated near-term hauling costs in Teton County at $.50 per cubic yard/mile plus penalty costs for routes through low-speed areas. The cost of processing raw material into finished aggregate is approximately $5.00 per cubic yard, regardless of the source. Typical royalty (fees) charged by commercial source contractors is $1.00 per cubic yard of processed material (FHWA 1991). The reclamation cost of commercial sources is covered by the operator's royalty. Reclamation cost on public land would be included in the cost of the road rehabilitation project, as administered by the Federal Highway Administration.

Table 2 shows the total estimated cost of hauling material from sources suggested in this alternative that are relatively near to different application areas in Grand Teton and southern Yellowstone. Haul cost was calculated at $.50 per cubic yard/mile to the central point of each road area (see Road Surfacing Areas map in the "Introduction" section), plus penalty fees for low-speed hauling (FHWA 1991). The table shows only the cost of hauling and any penalty costs. No typical reclamation costs per acre or per cubic yard of material could be generated by the Federal Highway Administration for this study due to widely differing environmental conditions and reclamation needs.

Compared to alternative B, the total haul cost from suggested sites of alternative A would reduce by approximately $17 million (1991 figures and depending on final site selection) the total 20-year NPS road rehabilitation program costs.

Conclusion. The suggested sources of alternative A would decrease the total 20-year program costs of park road rehabilitation in Grand Teton and southern Yellowstone approximately $17 million (1991 figures) compared to alternative B.

Impacts on Park Road Rehabilitation Costs — Alternative B

Analysis. Alternative B would have the greater cost of hauling material compared to alternative A because of the greater distance from relatively few material sources outside the park areas (see table 3). The total cost of hauling the projected material requirements of the

Table 2: Alternative A — Sources of Minimum Impact and Cost (Preferred)[a]

AREA	20-YEAR NEEDS	POSSIBLE SOURCES	HAUL COST (Low/High)[b]
1.	196,000 CY	Gros Ventre River area/Evans	$ 784,000 / 2,548,000
2.	355,000	Spread Creek area	1,242,500
3.	374,000	RKO	748,000
4.	412,000	RKO/Pilgrim Creek	1,442,000 / 1,236,000
5.	251,000	Pilgrim Creek area	2,384,500
6.	416,000	Gros Ventre River area/Evans	2,288,000 / 7,280,000
7.[c]	971,000	Snake River/Pilgrim Creek area	17,963,500 / 22,818,500
TOTAL	2,975,000 CY		$26,852,500 / 38,257,500

[a] Adapted from table 3, Relative Source Cost Factors (FHWA 1991)
[b] Does not include royalty costs at commercial sources, reclamation on public lands, environmental compliance on public land, or processing cost at all sites. Does include haul costs and penalty costs.
[c] Southern Yellowstone Park

Table 3: Alternative B — Sources Outside of Parks[a]

AREA	20-YEAR NEEDS	POSSIBLE SOURCES	HAUL COST[b] (Low/High)
1.	196,000 CY	Gros Ventre River (BLM)/Evans	$ 294,000 / 2,548,000
2.	355,000	Spread Creek USFS area	1,420,000
3.	374,000	Gros Ventre River (BLM)/Evans	3,366,000 / 7,667,000
4.	412,000	Spread Creek USFS area	3,090,000
6.	251,000	Spread Creek USFS area	3,639,500
6.	416,000	Gros Ventre River (BLM)/Evans	2,496,000 / 7,280,000
7.[c]	971,000	Spread Creek USFS area	29,615,500
TOTAL	2,975,000 CY		$43,921,000 / 55,260,000

[a] Adapted from table 3, Relative Source Cost Factors (FHWA 1991)
[b] Does not include royalty costs at commercial sources, reclamation on public lands, environmental compliance on public land, or processing cost at all sites. Does include haul costs and penalty costs.
[c] Southern Yellowstone Park

10- to 20-year park road rehabilitation program would be increased by about $17 million compared to the haul costs of alternative A.

Conclusion. Alternative B would have haul costs of approximately $17 million more than alternative A.

Impacts on Park Road Rehabilitation Costs — Alternative C

Analysis/Conclusion. Depending on the sites chosen, the impacts under this alternative would be similar to those under alternatives A and B.

CUMULATIVE EFFECTS — PREFERRED ALTERNATIVE A

Analysis. Most of the effects of alternative A would be concentrated at specific sties in a large geographic area — from near Flagg Ranch in the Parkway to south of Jackson. Effects would also be spread out over 10-20 years. Some effects would be more widespread in nature (e.g., air quality) due to winds and impacts caused by transporting material to construction sites.

To a large extent, all alternatives perpetuate past activities and effects of major road maintenance projects using material gathered from within parks as well as from commercial sources, but with a more orderly analysis of the whole program and with commitment to restore both previously and newly disturbed sites. In-park sources would be consolidated into a few sites, increasing the haul costs and mileage, but concentrating impacts to relatively few sites.

Proposed actions would generally result in temporary and localized impacts on air and visual quality. There would be no significant impact on water quality, floodplains, stream hydrology, fish, or wildlife. There would be beneficial effects of creating wetland and waterfowl habitat, and restoring more natural conditions on about 80 acres of disturbed land. Approximately 40 acres of undisturbed soil and vegetation would be impacted. Four animal species protected by the Endangered Species Act might be temporarily affected at the Snake River site south of Flagg Ranch, with no anticipated adverse impacts expected and with long-term benefits from site restoration.

There would be no effect on known cultural resources, and if archeological material were discovered, appropriate actions would be taken.

Overall cost of material and road rehabilitation would be $27 to $38 million in alternative A to $44 to $55 million in alternative B. There would be some moderate and short-term impacts on natural resources and visitor enjoyment. There would be moderate impact on residents and visitors of Jackson and the Spring Gulch road. There would be potential for negative or positive influence on the local material market that is impossible to predict.

There would be no foreseeable overall effect on the park ecosystem from actions at geographically separated sites inside or outside the park. Use of several consolidated sites would result in more modification of a given site, but the overall acreage of disturbance would be reduced by having fewer processing sites, etc. There would be no foreseeable indirect

effect, such as downstream hydrologic effects, impacting the foodchain and dependent species or encouraging other developments, on the park ecosystem from continued material extraction. Other similar actions (borrow material extraction) performed by public agencies would not affect park resources.

Development of additional commercial material sources outside the parks on private land might be encouraged by the prospect of identified,long-term needs for the southern Grand Teton area and a market for material. Development would be subject to county land use, and state and federal permit requirements, which should mitigate potential social or environmental conflicts.

Conclusion. There would be no significant long-term, irreversible adverse impacts on NPS natural or cultural resources or on visitor use and enjoyment. The cost of the NPS road rehabilitation program would be $27 to $38 million in alternative A to $44 to $55 million in alternative B.

AGENCIES CONTACTED

Army Corps of Engineers
Bureau of Land Management
Bureau of Reclamation
Federal Highway Administration
Jackson Hole Airport Board
Soil Conservation Service
Teton County Board of Commissioners
U.S. Fish and Wildlife Service
U.S. Forest Service
Wyoming Department of Commerce, State Historic Preservation Office
Wyoming Department of Environmental Quality
Wyoming Department of Game and Fish
Wyoming Department of Transportation

cc: EAS

AUG 1 1991

L3023 (660)

Memorandum

To: Director

From: Associate Director, Operations (sgd) Willis P. Kriz

Subject: Special Directive on the Administrative Use of In-Park Borrow Material

Attached for your signature is a special directive which provides field direction on interpreting and applying the 1988 NPS Management Policies related to NPS use of borrow pits and spoil areas (Chapter 9, Page 4). The desire to ensure consistency among parks and avoid potential litigation is the impetus for developing specific field guidance on the administrative use of mineral materials in parks.

This guidance was prepared by a work group consisting of individuals from the Mining and Minerals Branch of the Land Resources Division, Water Resources Division, Denver Service Center, and selected regional offices and parks. A draft of this guidance was reviewed by the regional offices and parks.

If you have any questions regarding this directive, please contact Einar Olsen of the Mining and Minerals Branch at 343-4968.

Attachment

bcc: 100; 190; 500; 600
DEN-Shaver:Grasser:Higgins:Reading and Project Files
WASO-Kriz:McCoy:Olsen:Reading File
WASO:EOlsen:eo:7/30/91:transmit.mem:343-4968

United States Department of the Interior

NATIONAL PARK SERVICE
P.O. BOX 37127
WASHINGTON, D.C. 20013-7127

TAKE PRIDE IN AMERICA

IN REPLY REFER TO:
A5623(660)

August 5, 1991

SPECIAL DIRECTIVE 91-6

To: Directorate, Field Directorate, WASO Division Chiefs and Park Superintendents

From: Acting Director

Subject: Field Guidance on Implementing the NPS Management Policies Re: Administrative Use of In-Park Borrow Material

This field guidance provides direction on interpreting and applying the 1988 NPS Management Policies related to NPS use of borrow pits and spoil areas (Chapter 9, Page 4). These policies contain several terms that are open to interpretation which could result in inconsistent implementation. The desire to ensure consistency among parks and avoid potential litigation is the impetus for developing specific field guidance on the administrative use of mineral materials in parks. This guidance is not applicable to coastal management issues such as navigation channel dredging, beach nourishment, dune rebuilding and natural levee repair. See NPS Management Policies Chapter 4, page 20, for guidance on shoreline management issues.

Definitions. For the purposes of this field guidance, the following terms are used:

Borrow pit - excavation from which mineral materials are taken.

Extraction or excavation site - a borrow pit or a quarry.

Functions necessary for park administration - actions defined in approved park plans or environmental compliance documents.

Mineral materials - common varieties of sand, stone, gravel, pumice, pumicite, cinders, clay, and common fill.

Spoil - native materials, e.g., soil, rock or overburden

Spoil area - disposal location for overburden or other soil or rock.

Quarry - an open pit or excavation where stone, sand, gravel or other mineral materials are obtained from open faces.

Use of In-Park Sources. In accordance with the NPS Management Policies, park managers should first look outside of parks for sand, gravel and borrow materials. In developing cost estimates for future park projects, park managers should assume that materials will be obtained from sources outside the park. In-park sources should only be considered if the following two tests are met: (1) acceptable sources exist in the park, and (2) economic factors make it totally impractical to import materials.

In determining whether "acceptable sources" exist in the park, park managers must evaluate the natural, cultural, socioeconomic, and visitor use effects of using existing and/or new sites. This guidance sets forth a series of questions that should be addressed in a written analysis evaluating the use of existing and new in-park sites. In the written analysis of new sites, park managers must address the requirements of NPS-12 (NEPA Compliance Guideline), other compliance/permit requirements, and all issues outlined below for existing pit use, including site selection criteria, reclamation plans, and economic considerations.

Potential NPS use of materials from new or existing sites on private lands inside park boundaries should be evaluated using the same process outlined for extraction from federally owned land in parks. This will require specific examination of park planning documents. For areas managed cooperatively as ecosystems, e.g., the Greater Yellowstone Area, resources outside of parks but in the ecosystem should be evaluated using the same criteria as in-park resources, subject to applicable laws.

The definition of "totally impractical" is, by necessity, case-specific. There is no set formula for determining what percentage increase in a project cost makes an outside source totally impractical. The park manager must weigh the expected costs and effects of an in-park source against expected costs and effects of outside sources to determine the acceptability of in-park sources.

Economic considerations to be evaluated for both outside and in-park sources include:

(1) cost of preparing appropriate planning documents, e.g., mineral source plan, NEPA compliance, technical studies including engineering, hydrologic, or reclamation analyses;
(2) cost of extraction of materials, and associated transportation, including equipment and labor cost;
(3) cost of damage to park roads resulting from truck traffic;
(4) cost of reclamation;
(5) traffic disruptions;
(6) health and safety implications of hauling material;
(7) cost associated with obtaining all State and local permits;
(8) potential savings of using old extraction sites for administrative purposes;

(9) benefits associated with having previously disturbed sites reclaimed;
(10) purchase price of mineral materials (if outside source); and
(11) cost of exotic plant management at project site(s) using outside sources, e.g., eradication or long term control, or costs of guaranteeing exotic species-free materials.

Monetary costs may often be greater when using sources outside of the park. However, when comparing the costs of inside sources versus outside sources, park managers should determine whether other funding sources exist which could cover the additional monetary cost of using outside sources, e.g., Federal Highway Administration, and factor that information into the analysis. Also, park managers should evaluate the possibility of extending the project over multiple years to make the use of outside sources economically feasible.

NPS Contractor Use of Borrow Pits and Spoil Areas. For purposes of this field guidance, mineral materials to be used by NPS contractors is the functional equivalent of NPS use. Contractors, including the Federal Highway Administration, performing work for the NPS on park projects may use mineral materials sources in the unit when such use is authorized by the Superintendent. However, the contractor's use of mineral materials, just as direct NPS use, must conform to NPS Management Policies, NEPA, other applicable statutes and regulations, and the criteria outlined herein.

Acceptable Sources Identified in Park Plan. Park management should ensure that acceptable sources for mineral materials are identified and analyzed in appropriate park planning documents and that the effects on natural and cultural resources have been considered and evaluated. Examples of plans in which such sources may be appropriately identified include general management plans, resource management plans, development concepts plans, and mineral materials source studies. If the park has plans for extensive mineral materials extraction, preparation of an areawide mineral materials source study may be appropriate. Planning documents addressing mineral materials sources must include appropriate NEPA and cultural resource compliance and public involvement. Parks should identify sites for extraction and disposal of mineral materials in advance, in anticipation of emergency situations, e.g., road slides, landslides, or floods, in the appropriate planning document. Additionally, managers should be aware that there can be cumulative effects from opening or continuing to use a number of mineral materials sites inside the park. Cumulative effects should be identified and analyzed in appropriate planning and/or environmental compliance documents.

Written Analysis. Any actual or potential in-park use of mineral materials from either new or existing sources requires a written analysis. This analysis shall include: basic site information such as name of pit, map, access, size, location in the park,

relationship to other facilities, and management zoning. Answers to the enclosed questions, along with a determination of acceptability signed by the Superintendent comprise the administrative record for the use of an existing site. The written analysis should be used in determining what constitutes appropriate NEPA compliance, e.g., categorical exclusions, environmental assessments, or EISs. Analyses of new sites must address, in addition to the requirements of NPS-12, all issues outlined herein for existing pit use.

Use of In-Stream Sites. Generally, in-stream sources should not be considered. Stream channels and floodplains are generally recognized as sensitive resources and are not usually suitable as sources for sand, gravel, or borrow. However, under some conditions, use of these areas my result in fewer or shorter-term impacts than alternative upland sources. These sources of borrow may be considered for use when it can be demonstrated through appropriate scientific study that all of the following are met:

(1) upstream and downstream channel stability will not be affected;
(2) water quality and aquatic and terrestrial habitats will not be adversely impacted;
(3) extraction pits can be designed to resemble natural features and function in a manner that does not encourage morphologic or vegetative changes;
(4) the extraction site will refill with mineral materials similar in characteristics to the removed borrow; and
(5) replenishment will occur in a reasonable timeframe.

Additionally, when an in-stream source is used, post-extraction monitoring must be conducted to assess the degree to which the above criteria are achieved. No new sources will be established on designated wild or scenic rivers.

Use of Pits In Designated or Proposed Wilderness Areas. Borrow pits are not permitted in designated or proposed wilderness areas, with the exception of small quantity use of borrow for trails, which must be in accordance with an approved wilderness management plan.

Effects on Natural and Cultural Resources. In some cases, active and inactive mining sites may not have had adequate environmental analyses performed at the time of initial disturbance. Consequently, additional environmental analyses should be completed prior to the continued use or reactivation of an existing site. Resource evaluations should include: water, soils, vegetation, fish and wildlife, archeological and historic sites and landscapes. Determination of impacts, including an assessment of their significance and cumulative effects, must be made in accordance with appropriate NPS guidelines. The potential for exotic plants to be introduced, and to spread and persist, should be evaluated

along with requirements for subsequent control.

Effects on Socioeconomic Resources. In evaluating alternative sources of borrow and selecting an actual source, park managers must consider the socioeconomic effects. These include effects on:

(1) existing local and regional land use patterns and zoning;
(2) direct and indirect effects on local and regional businesses and residents;
(3) the local and regional economy;
(4) other agencies (Federal, State, and local) and their projects; and
(5) concessions.

The socioeconomic analysis should also address impacts on park operations, e.g., need for additional park staffing, changes in staff schedules, traffic circulation, safety, and security.

Effects on Visitor Experience. The NPS strives to minimize the public's awareness of extraction activities, including the sights, sounds and smells associated with those activities. Extraction sites should not be located in areas of primary visitor use and should not be visible from areas of concentrated visitor use, nor from primary viewsheds. Continued use of existing sites should be evaluated for impacts on visitors and the visitors' experience. Factors to be considered include:

(1) type and degree of impacts;
(2) visibility of sites;
(3) expectation of visitors (wilderness vs. development zones);
(4) park zoning considerations; and,
(5) surrounding or adjacent views.

Reclamation. All mineral material sites in park units ultimately should be reclaimed. Park managers should ensure that an adequate reclamation plan is developed before authorizing use of in-park sources of mineral materials or continuing use of existing pits. Post-extraction use of the sites should be defined at the time site disturbance is being considered. This may include returning the area to pre-extraction use, reclaiming the site to be in harmony with surrounding areas, or using the site for administrative purposes, e.g., storage or staging areas. Areas to be used for administrative purposes should be recontoured and reclaimed to the maximum extent possible while still allowing for administrative use. Park managers must consider the cumulative effects of multiple administrative sites in determining appropriate post-extraction uses.

Reclamation plans must address:

(1) health and safety problems on site;
(2) control of active sedimentation/erosion problems;

(3) drainage issues;
(4) need to recontour (lay back) to allow revegetation;
(5) timeframe for achieving reclamation;
(6) reestablishment of native vegetation;
(7) sources of native plant material;
(8) control of exotics;
(9) topsoil storage and handling;
(10) access;
(11) contaminated or hazardous soils; and
(12) site monitoring.

Some aspects of reclamation can be most effectively accomplished concurrently with the extraction operation. Control of erosion and exotic species may need to be an ongoing effort. For long-term operations, portions of the disturbed area should be reclaimed as the operations proceed into other areas. All extraction sites developed or reopened for specific projects should be reclaimed within the timeframe of that project.

Park managers are encouraged to provide technical assistance to adjacent land owners in the preparation of reclamation plans where external source development, use, and reclamation could have potential adverse impacts on park resources.

Questions

In order to implement this guidance, a written analysis addressing the following questions should be prepared. These questions apply to both new and existing borrow pits and spoil areas. A written analysis must be prepared in conformance with the provisions of the NPS Management Policies.

1. What is the proposed project?

2. What type and amount of mineral material is necessary to complete the project?

Evaluating External Sources

3. Are the necessary mineral materials available from sources outside the park?

4. What is the cost to complete this project using mineral materials from outside sources and what are the general environmental impacts?

5. Do economic factors make it "totally impractical" to import materials?

6. What are the pertinent socioeconomic factors at the site and in the affected area?

Evaluating Internal Sources

7. Do previously disturbed sites exist inside the park that provide the quality and quantity of mineral materials needed? [Impact analysis and other environmental compliance documents will be more extensive if the site is new.]

8. Will the extraction operation remain in the existing disturbed area or will it expand onto previously undisturbed lands?

9. How is the site identified and zoned in appropriate park planning and/or environmental compliance documents?

10. What are the characteristics of the proposed extraction operation?

11. What are the natural resources at the site and in the affected area?

    a. Vegetation, including exotic plants
    b. Wildlife
    c. Soils
    d. Water resources
    e. Soils and Geology
    f. Air Quality
    g. Paleontological resources
    h. Other

12. What are the cultural resources at the site and in the affected area?

13. What are the impacts to park visitors, and what can be done to mitigate these impacts?

14. What are the impacts to natural and cultural resources, and what can be done to mitigate these impacts?

15. What are the impacts to the socioeconomic resources of the area, and what can be done to mitigate these impacts?

16. Describe how the proposed action could contribute to cumulative impacts over a period of time.

17. Would the action, when added to other past, present, and reasonably foreseeable future actions, have a significant effect?

18. Describe appropriate post extraction use and its consistency with planning documents.

19. Can the site be effectively reclaimed to accomplish the desired post extraction use?

20. What are the steps necessary to reclaim this site? Has a reclamation plan been prepared for this site?

21. Have compliance requirements been met?

    a. NEPA
    b. NHPA, Sections 106 and 110
    c. Threatened and Endangered Species
    d. Floodplains and Wetlands, 404 Permits
    e. State and Local Permits (depending on jurisdiction)
    f. Air Quality Permits
    g. Others

22. What is the cost of the in-park source including the mitigation and reclamation measures identified above?

Park Manager Certification

Based on the answers to the above questions, and on analysis of the issues related to the extraction of mineral materials in this project # _____, borrow site _____ (# or name) has been determined as an acceptable site/source. Outside park sources have been evaluated and determined to be totally impractical from a budgetary standpoint. Effects to natural and cultural resources are not significant. Socioeconomic impacts and the effects on visitor use have been analyzed and are deemed to be acceptable. A reclamation plan for the site has been prepared. This action is consistent with all applicable compliance, permitting, and laws.

_____

Superintendent's Signature and Date

Answers to Questions

1. See introduction to alternative A, page 13.
2. See table 1, page 6.
3. See "Study Area" and "Need for Material Sources" in "Introduction" section, page 1
4. See table 3, page 82.
5. Longer haul distances, plus penalties, would increase costs; see page 83. Because this is a general plan, determinations of costs and whether or not an outside source is "totally impractical," must be determined on a case-specific basis.
6. See page 41.
7. The plan identifies previously disturbed sites in Grand Teton and the Parkway that still have materials of sufficient quantity and quality available. See alternative A section under "Sources." Previously disturbed sites include the Snake River, RKO, and Kelly sites, part of the Pilgrim Creek area, and part of the Gros Ventre River area.
8. Some of the sites identified in alternative A are new (undisturbed) sites. See alternative A "Sources," page 14.
9. The in-park site in alternative A are zoned as follows:

   GRTE Natural Environment Subzone: Pilgrim Creek, Kelly, RKO
   GRTE Resource Utilization Subzone: Spread Creek
   JODR Special use Subzone (gravel extraction): Snake River site

10. See alternative A description, page 13.
11. See "Affected Environment," page 35.
12. See "Affected Environment," page 35.
13. See "Impacts on Visitor Use," page 76.
14. See "Environmental Consequences" section, page 63.
15. See "Social Issues," page 75.
16. See "Cumulative Effects," page 83.
17 No. See "Cumulative Effects," page 83.
18. All sites would be reclaimed when excavation is complete; see page 14.
19. Reclamation plans would be developed as part of any excavation plans on a site-by-site basis.
20. Reclamation steps would be determined on a site-by-site basis.
21. All compliance requirements would be met on a site-by-site basis prior to any excavation activities.
22. Specific costs would be determined on a site-by-site basis.

GLOSSARY

Active Stream Channel — An open conduit that is unvegetated and contains water during the base flow period.

Abandoned Dry Channel — A water channel that has been recently cut off from the main channel by bed load deposition and channel avulsion (lateral movement) and contains no moving water even during average high-water flows.

Base Flow — The average flow following the major period of snowmelt and the onset of snowmelt the following year (normally July 15 to May 1).

Bed Load Recharge — The deposition of material moved downstream by high water flows along the channel bed following cessation of high water.

Chip-Seal Coat — Manufactured aggregate placed on a thin layer of bituminous material, primarily used to protect asphaltic concrete pavement.

Common Borrow Material — Suitable material from sources outside the road prism, used primarily for embankments.

Crushed Aggregate — A well-graded processed rock placed between the subgrade and asphaltic concrete pavement.

Embankment Fill — A structure of soil, soil aggregate, or broken rock between the original ground and subgrade.

Floodplain — Valley areas adjacent to any size stream or river that can be covered by floodwaters. Flooding of these areas can result from excessive rainfall or snowmelt, or a combination of the two. If runoff is increased to the point that the carrying capacity of the channel is exceeded, flooding occurs.

High-Water Channel — An open conduit containing little or no vegetation that seasonally or periodically contains moving water during the high-water period.

Ordinary High-water Line — The average height of the high water over a 19-year period.

Raw Material — Matter in its natural state.

Reclamation — Actions taken to reestablish plant cover and topography of a disturbed area to resemble that present prior to disturbance.

Rehabilitation — See reclamation.

Restoration — The replacement in kind of preexisting topography, soil structure, and vegetation following disturbance of a site.

Revegetation — The reestablishment of plant cover on an unvegetated site.

Sand — A loose granular material resulting from the disintegration of rock. Particles are smaller than gravel but coarser than silt.

Topsoil — Surface soils that contain organic and other materials suitable for plant growth.

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